DOCUMENT RESUME

ED 288 054 CE 048 950

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TITLE	In-Country TEFL/Crossover Tropical Agricultural Training Manual. Trainee Edition. Training for Development. Peace Corps Information Collection & Exchange Training Manual No. T-37A.
INSTITUTION	Peace Corps, Washington, DC. Information Collection and Exchange Div.
PUB DATE	Sep 85
NOTE	438p.; For a related trainer's manual, see CE 048 949.
PUB TYPE	Guides - Classroom Use - Materials (For Learner) (051)
EDRS PRICE	MF01/PC18 Plus Postage.
DESCRIPTORS	Adult Education; Agricultural Education; Agricultural Occupations; Agricultural Production; *Agriculture; Animal Husbandry; Behavioral Objectives; *Course Content; Course Organization; Cross Cultural Training; *Demonstration Programs; *Developing Nations; Economic Development; Educational Objectives; Educational Resources; English (Second Language); Farmers; Foreign Countries; Learning Activities; Learning Modules; Lesson Plans; Models; Postsecondary Education; Units of Study; *Volunteer Training
IDENTIFIERS	*Peace Corps; *Thailand

ABSTRACT

Correlated to the trainer's manual for the same course, this trainee's manual has been designed for Peace Corps trainees coming to Thailand without stateside agricultural training. Although it was developed for the training of Test of English as a Foreign Language (TEFL)/Crossovers, the majority of sessions are appropriate for other Peace Corps programs in Thailand, as well as other Peace Corps countries. The manual is organized in four parts. The first part describes the program and includes a general perspective, evaluations and progress reviews, and performance objectives by skill group. Part II, overall training schedules, appears only in the Trainer's Manual. Schedules appear as the first page for that week in Part III of the Trainee's Manual. Part III provides schedules, designs, and handouts for each week of the eight-week course. Handouts provide information, sample forms, and charts to be used in the agricultural training program. The final part, appendixes, contains program-specific sessions, session additions, a discussion of the role of the trainers in development, a glossary of technical terms in Thai and English, and a resource list. (KC)

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Peace Corps

IN-COUNTRY TEFL/CROSSOVER TROPICAL AGRICULTURAL TRAINING MANUAL

(TRAINEE EDITION)

U.S. PEACE CORPS/THAILAND

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This manual was produced on two Kaypro computers. It was input into a Kaypro II and completed by Peace Corps volunteer Michael Ordonez on a Kaypro 2X--one of the six Kaypro 2's donated to Peace Corps Thailand by the Kaypro Corporation for volunteer use. Suffice to say that, with the number of editors and contributors, had this manual been produced on a typewriter, we would still be working on the first draft. Thank you Kaypro.

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Printed By:

PEACE CORPS
Information Collection and Exchange
September 1985

PART I

Table of Contents

Introduction

TABLE OF CONTENTS (TRAINEE MANUAL)

PART I: PROGRAM DESCRIPTION
Introduction 1
General Perspective 1
Evaluations and Progress Reviews 4
Performance Objectives by Skill Group 6

PART II: SCHEDULES

These overall training schedules only appear in The Trainer's Manual. A copy of each week's schedule appears in the Trainee Manual as the first page for that week in Part III.

PART III: SESSIONS 16
Week I: Schedule, Designs and Hand-outs 17
Week 2: Schedule, Designs and Hand-outs 99
Week 3: Schedule, Designs and Hand-outs 155
Week 4: Schedule, Designs and Hand-outs 191
Week 5: Schedule, Designs and Hand-outs 243
Week 6: Schedule 291
Week 7: Schedule, Designs and Hand-outs 291
Week 8: Schedule, Designs and Hand-outs 363

PART IV: APPENDIXES 399
A. Program Specific Sessions 400
B. Other Components 427
Session Additions 429
Role in Development 430
F. Glossary of Technical Terms in Thai and English - 433
G. Resource List 439

INTRODUCTION

GENERAL PERSPECTIVE

The "In-Country TEFL/Crossover Tropical Agricultural Training Manual" has been designed for trainees coming to Thailand without stateside agricultural training. While it has been developed for the training of TEFL/Crossovers, the vast majority of sessions are appropriate for other Peace Corps programs in Thailand , as well as other Peace Corps countries. In order to meet the needs of this training program, the writers of this manual had to do a great deal of planning, preparation, research and design work. It is hoped that this manual will save future training staffs from duplicating much of that effort, so that they can concentrate on improving upon the past. The training sessions and recommendations presented here have proved to provide good learning experiences without taxing staff energies too greatly. Some of the concepts upon which this training is based are presented below.

Hands-on Experience: All trainees are college graduates and are fairly confident in their ability to learn, especially in an academic environment. However, the nature of the Crossover job requires skills, ie. the ability "to do" things--agricultural things. This requires a great deal of hands-on training to allow trainees to learn and practice actions, concepts and experiences that most have never before encountered. This sort of learning can not be replaced by lectures and reading. Furthermore, hands-on training models a learning/teaching style most effective for working with Thai students. One relevant aspect of vocational education in Thai schools is the separation of classroom and practical learning--generally, with the latter being underemphasized. However, even with their lack of language ability at the outset, Crossover volunteers can use the methods we model here to focus on practical learning and, in doing so, can demonstrate the integration of knowledge with practice. This requires adequate practical skills on the part of Crossovers and their confidence in those skills.

Small Scale Projects: A variety of factors such as market access, financing, land, water and the school calendar, limit school agricultural programs to small-scale activities. This is in line with what students and poor farmers can do themselves. Therefore, training activities are designed on a small-scale. This Tropical Agriculture Training Program is like a school agricultural program in microcosm;it exists for education. Training activities need only be big enough to allow quality learning to take place. Trainees are exposed to large-scale activities, but their own are designed to be small.

Community Centered: An important goal of the L.S.S. (Lower Secondary Schools) project, in which Crossover volunteers work, is that students are to receive a general and vocational education that is applicable in and appropriate to each school's surrounding community. Knowledge and skills that are applicable only in other provinces and cities are de-emphasized in favor of agricultural and economic activities that already exist locally or that are reasonably possible for local farmers and their children. Therefore, trainees should learn skills appropriate to rural areas and to the areas in which they will be working. As this training program is designed to cover general material and skills relevant to a number of different locales, it was considered important to include an independent study aspect so that trainees might do background research on their future locale while still being trained and supported by staff.

Strong General Foundation: Because of the training emphasis described here, there is not a great deal of time devoted to theoretical concerns. The scientific knowledge and its agricultural applications necessary for a full understanding of agriculture is impossible to impart in such a short period of time. Thus, a foundation is provided so that trainees have enough information to pursue reading and research during and after training. A strong understanding of basic agricultural concepts is necessary for continued learning. Trainees are introduced to important material and the most important concepts during training so that they can best make use of it later.

Independent Learning: It follows that Crossovers need to do a great deal of independent study to be useful in agriculture. Training encourages trainees to learn on their own and gives them some time and opportunity to do so. Such learning includes assigned and optional readings, informal learning during Home-stay, individual projects and pursuit of particular interests. Staff is available to help initiate and assist in such activities with the goal of increased trainee confidence and ability. Also, trainees draw on local resources (farmers, village and district officials and other resources) at their sites.

Trainee Responsibility: This Tropical Agricultural Training Program is an adult learning experience. Although trainees are like children in their language ability and cultural knowledge, trainers should never forget that trainees are adults. As adults, trainees need to be in control of their lives. This means that trainers are not school teachers. In turn, trainees are not students. Rather, training is a learning partnership, with trainees, not staff, responsible for the learning. Staff supports trainee responsibility with advice, knowledge, skills, experience, friendship and guidance. Suggestions on how to encourage trainee responsibility appear later in this Introduction.

Field Day: The major event that culminates training is Field Day--a trainee-planned and trainee-run day of demonstrations, games, entertainment, food and fun. It is an opportunity for trainees to do something significant on their own, rather than follow the plans of trainers. While staff members lay down necessary guidelines, bring up important cultural and logistical points and act as resources, the trainees run the show, make the decisions and do the work. Trainees welcome the chance and they learn a great deal (in all components) during the process. In our experience, we saw a change in the level of trainee responsibility after Field Day. They took charge of more training activities, becoming more responsible, active and involved than they were previously. Many problems came with Field Day but trainees were able to solve them adequately. It is expected that future Field Days will by no means be perfect, but they will be fun, enlightening and will provide excellent learning and cross cultural experiences.

Integration of Components: The agricultural training detailed in this manual integrates a number of aspects of training. These "components" refer to agriculture, Field Day, Crossover-specific skills, language skills, cross-cultural skills, personal orientation and role in development. Further, in each session we have included technical vocabulary to be rendered into the local tongue. We have tried to stress how sessions should attempt linkages with other components--or, if possible, include other components directly. However, a manual cannot do it all. Integration is not a result of the materials, it must involve the personnel of a training program. A Language/Cross-Cultural trainer might (and should) co-facilitate a session involving a component other than language. Conversely, agricultural trainers should participate in the sessions and activities of other components. Successful integration is a product of creative teamwork, support and co-operation among all staff members. This kind of integration will help produce well-rounded PCVs who not only do well in each component, but who wrap them all up in a living package of technical skills, cultural awareness, communication ability and personal confidence.

Sanuk (Fun): Finally, we should never allow the importance and quantity of the training content to keep training from being fun. This is true in Thailand, where "sanuk" and "sabai" are so pervasive. If these concepts of fun are successfully incorporated into training, agriculture and the training experience will be much more meaningful for trainees than if they are not. When trainees arrive at their sites with an attitude of "agriculture is fun," then, they will be ready to work (and play) with Thais.

EVALUATIONS AND PROGRESS REVIEWS

Evaluation Philosophy:

The evaluation of trainee abilities and progress is very important to their successful training. Evaluation is necessary to ensure that all trainees are qualified for Peace Corps service and it must be done carefully. The tone and method of evaluations should be honest, straight-forward, and reasonable. A systematic, clear and open evaluation process keeps everyone informed of each trainee's progress. If handled with sensitivity, each trainee will know the things s/he must do and can set about to do them. There should be no surprises. Indeed, the less subjective the process is, the less chance for misunderstanding and disagreement. The more trainees do self- and peer-evaluations, the more they will view trainers as learning-supporters, not as teacher-judges. This is important in adult learning. It lessens stress and contributes to good, open relations between trainees and trainers. There is time built in to training for trainees to accomplish the performance objectives and there are a number of evaluation opportunities along the way; further, evaluations need not be threatening and overly serious. Evaluations should fit into the training atmosphere of fun and achievement. In line with other efforts to make trainees as responsible for training as possible, trainees should be involved in assessing themselves, other trainees and trainers. Further, whenever staff does evaluations, unnecessary secrecy and heavy-handedness should be avoided.

The method of evaluation of individual objectives and the overall evaluation process should be determined before trainees arrive. This will allow staff to fully explain the process during the session: "Introduction to Agriculture, GP and PS Sessions". Such pre-planning should not prevent trainees from making suggestions about adjusting objectives, the evaluation of objectives and the way progress reviews are done. In fact, staff should encourage such suggestions.

The Performance Objectives:

The performance objectives are the foundation of the evaluation process. They must be carefully reviewed, considered and revised, if necessary. While individual objectives may be easy or difficult to accomplish, they should average out to be somewhere in the middle. The performance objectives recommended herein were written to be specific, clear and directly relevant to the program trainees will go into. If future programs determine that additional performance objectives are necessary, the agriculture staff, with assistance from other staff members, the program manager and current PCVs in the program, should carefully revise them.

Every performance objective has at least one session objective which corresponds to it. If your staff revises the training design and a new performance objective is added, a new session should be added or a session modified in order to cover that performance objective. If there is no corresponding session objective, that performance objective should be dropped. In this way, when the staff reviews the schedule, if it will be clear when each performance objective should be fulfilled by the trainees and when the Progress Reviews (scheduled times for trainers and trainees to evaluate and discuss progress according to the performance objectives) are scheduled, specific objectives that should have been completed by that time can be listed.

Quizzes:

The next step is to determine how each objective is to be evaluated. A quiz will come a day or two before each progress review, but quizzes are only appropriate for evaluating certain objectives. Some objectives simply require attendance at a session or activity. Others are daily or regular chores which must be done for a large part of the training, (weeding (9-3) is one of these), and which show results in the health of crops and animals. Evaluation forms can be used by trainers and trainees to monitor such objectives. Sometimes, asking a few questions will suffice. In fact, some assignments are obviously done or not.

Fulfillment of Objectives and Progress Reviews:

After setting target dates for the completion of each performance objective and determining how each one will be evaluated, the staff member (responsible for that trainee) and the trainee independently check off each objective when it is fulfilled. Later, at the next Progress Review, the trainer and trainee compare their lists for differences of opinion. This will help staff understand how trainees view their own progress, in addition to highlighting what has been--and remains to be--accomplished.

The Trainee File:

The agricultural staff keeps a file on each trainee. Such files must be confidential, available only to trainers and the trainees whose files they are. Trainees can, if they wish, show their files to others. The files include a performance objectives checklist for staff to record the accomplishments of each trainee as well as notes, observations and concerns. Reports or other materials produced by trainees can also be included in the files.

PERFORMANCE OBJECTIVES BY SKILL GROUP

The training program includes regular evaluations of trainee progress. At each one of these progress reviews, some of the following objectives will be fulfilled by each trainee, while other objectives will be only partially fulfilled. As training progresses, the number of fulfilled objectives will increase. At the final progress review, fulfillment of the objectives must be met by each trainee. Failure to meet critical objectives--particularly in the program-specific and cross-cultural areas could disqualify the trainee from Peace Corps service.

It is important to note that fulfillment of each and every objective means adequate skills and knowledge as stipulated in each objective. Fulfillment does not mean expertise, it simply means fair and adequate attainment. This is why trainees are expected to fulfill almost all of the objectives.

GROUP 1: TRAINING INFORMATION AND ADMINISTRATION

- Understands the objectives of agricultural training.
- Takes part in training evaluations.
- Evaluates personal, group and staff performance.
- Completes all quizzes.

GROUP 2: AGRICULTURAL ENVIRONMENT BASICS

- Understands agriculture's place and importance in the Thai economy.

- Knows the basic successes and problems of Thai agriculture.

- Names five physical features of the agricultural environment and explains how they interrelate with agriculture and farmers.

- Names 5 non-physical features of the agriculture environment and explains how they interrelate with agriculture and farmers.

- Identifies host-country crop production techniques and habits that differ from the methods taught in this training.

- Uses local tools.

GROUP 3: CROP PRODUCTION MANAGEMENT PRINCIPLES

- Keeps records of all crops planted.
- Lays out one vegetable plot (individually) and one field crop plot (in a group), both of proper size and shape.
- Identifies the major differences between subsistence and market farming, along with the similarities.
- Understands how the farmers' outlook (subsistence, market, or combination of both) affects the practices they use and the decisions they make.
- Does a simple market analysis.
- Buys and sells some agricultural products.
- Identifies how marketing determines a crop's success or failure.
- Explains the principle of integrated farming and gives three examples of integration.
- Finds the sources of important inputs and equipment.

GROUP 4: UNITS OF MEASURE

- Makes conversions between English and metric measurement systems.
- Calculates fertilizer rates in metric systems.
- Calculates pesticide rates in metric systems.
- Calculates plant populations and spacings in both systems.
- Makes conversions to and from the Thai system.
- Calculates feed ratios in the metric system.

GROUP 5: SOIL MANAGEMENT AND FERTILIZER USE

- Lists the classifications of soil types.
- Identifies soil types of field samples.

- Explains the following soil properties and how they are important in crop production: structure, tilth, depth, levels, drainage, water holding capacity, texture.
- Makes a compost pile and explains the process.
- Identifies organic sources (available in-country) of the major nutrients.
- Applies and understands the principles of applying organic fertilizers.
- Applies and understands the principles of applying inorganic fertilizers.
- Measures slope using a simple method.
- Identifies important soil conservation problems in-country and appropriate conservation techniques.
- Knows all of the macro- and micro-nutrients.
- Knows the role each macro-nutrient plays in plant growth and health and identifies deficiency symptoms.
- Determines fertilizer needs from deficiency symptoms.

GROUP 6: WATER MANAGEMENT

- Hand waters vegetable plots.
- Furrow-irrigates field crops.
- Identifies the water needs of all crops grown.
- Uses simple techniques to determine soil water content.
- Understands the concepts of field capacity, holding capacity, saturation.
- Understands how to furrow, drip, clay-pot and flood irrigate.

GROUP 7: INSECT CONTROL

- Distinguishes between sucking and chewing insects.
- Distinguishes among the life-cycles of moths, beetles and aphids.

- Identifies, in the field, five common vegetable pests and three important field crop pests.
- Understands the concept of economic threshold and knows how to monitor insect populations.
- Understands integrated pest management.
- Explains six methods of insect control that are appropriate for small-scale applications.
- Builds one type of insect trap.

GROUP 8: DISEASE CONTROL

- Knows the difference between diseases, natural senesence, and nutrient deficiencies.
- Understands major disease types: fungal, viral, bacterial, inorganic.
- Identifies important disease vectors.
- Identifies, in the field, common vegetable diseases.
- Explains five methods of disease control that are appropriate for small-scale applications.

GROUP 9: WEED CONTROL

- Understands the effects weeds have on yields.
- Identifies common weed types and their means of propagation.
- Practices appropriate weed control in all plots.

GROUP 10: PESTICIDE SAFETY AND USE

- Knows and understands pesticide classifications and labels, including key words in the local language.
- Understands the ways different types of pesticides affect targeted pests and beneficial species.
- Knows how to store and transport pesticides, deal with spills and dispose of used containers.
- Treats simulated accidental poisonings.

- Determines application rates for small plots and calibrates applicators accordingly.
- Mixes and applies a pesticide.

GROUP 11: BASIC BOTANY

- Understands general botanical classifications.
- Identifies major plant parts.
- Understands how plants propagate and their corresponding life-cycles.
- Understands the differences between annuals and perennials.
- Identifies the parts of a seed and understands the germination process.
- Does a germination test.
- Understands how the placement of seed affects germination rate and seedling health.

GROUP 12: VEGETABLE PRODUCTION

- Identifies the major vegetable families and their most important characteristics.
- Understands the importance of proper seed-bed preparation.
- Plants and grows a variety of directly seeded vegetables: cucumbers, squash, long beans, morning glory, coriander, parsley, lettuce, radish.
- Seeds, raises and transplants seedlings of: tomatoes, peppers, eggplant, cabbage, kale, Chinese cabbage, greens.
- Plants and grows from bulbs: garlic, onions.
- Keeps detailed records for all vegetable plots.
- Deals with common problems as they arise.
- Stakes and trellises the appropriate crops.
- Harvests crops at the correct time.

- Identifies which vegetable species are appropriate for a variety of planting situations.

- Designs a garden plan.

GROUP 13: FIELD CROP PRODUCTION

- Plants (in groups): corn, soybeans, mung beans, peanuts, cassava, sugar cane, sweet potatoes.

- Knows the life cycles and planting seasons for the above crops.

- Transplants rice.

- Knows the stages of rice growth and the important management techniques of rice production.

- Applies the relevant fertilizer, water, soil and pest management techniques to the production of the above field crops.

GROUP 14: FRUIT PRODUCTION

- Identifies the fruit and leaves of major fruit crops: mango, papaya, coconut, lime, tamarind, custard apple.

- Air-layers one fruit tree.

- Grafts, using three different methods, other trees.

- Plants and maintains one seedling.

- Understands simple techniques to ensure good tree growth and fruit production.

GROUP 15: MUSHROOMS

- Understands the reproduction of mushrooms and their life-cycles.

- Knows the conditions necessary for good mushroom growth.

- Grows and harvests rice-straw mushrooms.

GROUP 16: POULTRY PRODUCTION

- Handles chickens properly.

- Distinguishes the major breeds found in-country and identifies them as meat, egg or dual-purpose.
- Names important internal and external body parts of poultry in English and Thai.
- Knows the nutritional needs of chicks, broilers and growers.
- Mixes appropriate feeds.
- Feeds chickens.
- Waters chickens.
- Knows the water requirements of different kinds of chickens.
- Knows the major chicken diseases and how to prevent them.
- Vaccinates chickens.
- Practices sanitation regarding water, feed, equipment, housing and personnel.
- Understands the housing needs of chicks, broilers, layers and native breeds.
- Constructs a brooder.
- Constructs coops and cages.
- Keeps records for all aspects of chicken production included in training.
- Uses local materials in construction and for equipment.
- Slaughters one chicken and cleans it.
- Does a post-mortem to identify major internal organs.
- Understands simple techniques for improving native chicken raising.
- Understands marketing considerations that are relevant to chickens.
- Knows the major differences between raising ducks and raising chickens.

GROUP 17: SWINE PRODUCTION

- Handles pigs of all sizes.
- Distinguishes the major breeds raised in-country.
- Knows the nutritional needs of pigs of all ages and locally available sources of vitamins and protein.
- Mixes appropriate feeds.
- Feeds and waters pigs.
- Understands the water requirements of pigs, for drinking, cooling and sanitation.
- Knows common signs of pig illness and where to turn to for diagnosis.
- Gives iron injections, clips needle-teeth and ear notches piglets.
- Castrates a piglet.
- Practices sanitation regarding water, feed, equipment, housing and personnel.
- Detects and controls internal and external parasites.
- Understands the housing needs of all ages of pigs.
- Constructs a pig pen with feeder and waterer.
- Understands the ear-notching system used in-country.
- Keeps records for all aspects of pig production included in training.
- Uses local materials for equipment and construction.
- Observes a pig post-mortem.
- Understands basic breeding concepts and principles.
- Knows simple techniques for improving village pig production.
- Understands marketing considerations that are relevant to pigs.

GROUP 18: FISH PRODUCTION

- Identifies major freshwater food fish, both those commercially raised, those found in streams and their predators.
- Understands pond digging and preparation.
- Knows easy-to-find, inexpensive feed.
- Releases fingerlings.
- Understands major factors in pond management.
- Harvests adult fish.
- Observes induced spawning.

GROUP 19: DEMONSTRATIONS

- Researches an independent study topic of personal interest and submits a 2-page outline.
- Presents a demonstration in English.
- Presents the same demonstration in Thai on Field Day.

GROUP 20: FIELD DAY

- Participates in the planning and organization of Field Day.
- Takes responsibility for one of the Field Day tasks.
- Participates in Field Day.
- Evaluates personal and group performance on Field Day.

GROUP 21: GENERAL PROGRAM SESSIONS (GP)

- Understands the goals and objectives of the Peace Corps Program assignment.
- Understands the goals and objectives of the agency assignment.
- Understands role and duties as expected by Host Country government, receiving agency, co-workers, Peace Corps and peers.
- Understands the workings of the Host Country's bureaucracy, particularly the workings of the receiving agency.

- Knows how to locate local resources: inputs, equipment, successful farmers, government agencies, research and teaching institutions, private companies, professional associations and other volunteers (PC, CUSO, GVS, GVC, TVS, VSO, NZV, JOVC).
- Is familiar with the work styles and attitudes of farmers and has strategies for working with them.
- Shares useful knowledge from PCV visits.
- Evaluates personal communication skills.
- Considers strategies for working with others.
- Assesses personal work style and habits.
- Understands how "projects" are viewed by receiving agency and Peace Corps.
- Knows what PC support is available for projects.

GROUP 22: PROGRAM SPECIFIC SESSIONS (PS)

- Understands the technical and general objectives for TEFL/Crossover volunteers in Thailand. (See Appendix H for specific objectives.)
- Visits a LSS Project school.
- Understands the formal and informal hierarchies and relationships at small, rural schools.
- Understands the duties and position of principals.
- Has strategies for working with principals.
- Understands duties/position of agricultural teachers.
- Has strategies for working with agricultural teachers.
- Understands Thai student needs, motivations and habits.
- Understands what "Home Projects" are.
- Knows of agricultural projects that are suitable at LSS Project schools.
- Has a strategy for analyzing school resources, capabilities, needs and problems.
- Has strategies for establishing the Crossover Role within LSS Project schools.

PART III

Agriculture and General Program Session Designs

WEEK #1 SCHEDULE

-	-	-	Pre-Training Preparation	Six weeks	-
1	1	0	Group Resources Assessment	17:00-18:00	C
2	1	1	Planting Cucurbits	06:00-08:00	F
-	-	-	Breakfast *	08:00-09:00	-
3	1	1	Plot Layout and Introduction to Metric #1	09:00-11:00	F/C
4	1	1	Meet Center Director & Staff	11:00-12:00	F/C
-	-	-	Lunch *	12:00-13:30	-
-	-	-	L/CC	13:30-15:00	-
5	1	1	Livestock Orientation and Overview	15:00-16:30	F/C

* Breakfast and lunch are shown here for reference's sake and will not appear later.

6	1	2	Planting Maize	06:00-08:00	F
7	1	2	Cage and Pen Construction	09:00-11:00	F
8	1	2	Preparation for Chicks	11:00-12:00	F
-	-	-	L/CC	13:30-15:00	-
9	1	2	Direct Seeding Principles	15:00-16:30	C
10	1	3	Planting Direct Seeded Vegetables	06:00-08:00	F
11	1	3	Cage and Pen Construction	09:00-11:00	F
12	1	3	Preparation for Pigs	11:00-12:00	F
-	-	-	L/CC	13:30-15:00	-
13	1	3	Introduction to Ag, GP and SP Sessions	15:00-16:30	C
14	1	4	Planting Pulses	06:00-08:00	F
15	1	4	Cage and Pen Construction	09:00-11:00	F
16	1	4	Newcastle's Vaccine	11:00-12:00	F

-	-	-	L/CC	13:30-15:30	-
17	1	4	Program Manager I	15:30-16:30	C
18	1	5	Cage and Pen Construction	06:00-08:00	F
19	1	5	Laying Hens Arrive/Record Keeping	09:00-10:30	F/C
20	1	5	Seed Germination Testing	10:30-12:00	F/C
-	-	-	L/CC	13:30-16:30	-
21	1	6	Composting Techniques	06:00-08:00	F
22	1	6	Using Organic Fertilizers	09:00-10:00	F/C
23	1	6	Housing and Watering	10:00-11:30	F/C
24	1	6	Record Keeping (Crops)	11:30-12:00	F/C

SESSION TITLE: GROUP RESOURCES ASSESSMENT

SESSION #1 WEEK #1 DAY #0 (1-1-0)

PRESENTER:

CO-FACILITATOR:

TIME: 17:00-18:00 (Sunday) C

INTRODUCTION: SESSION OBJECTIVES

Trainees and staff introduce themselves. Trainees brainstorm interview questions that will assess each others' skills, experience, knowledge and interests. An interview format is pre-written on a flipchart and displayed. Staff members pair off with trainees to interview each other. It is important for trainers and trainees to be aware of the group's resources. This will help trainees appreciate the trainers' experience and it will help trainers assess trainees' knowledge. Lastly, this activity will help staff and trainees to get to know each other.

Objectives:

- To share the skills, experience, knowledge, and interests of trainees and trainers.
- To practice gathering information.

HAND-OUTS: none

READING ASSIGNMENT: none

TECHNICAL VOCABULARY: none

SESSION TITLE: Planting Cucurbits

SESSION #2 WEEK #1 DAY #1 (2-1-1)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

INTRODUCTION: SESSION OBJECTIVES

Cucurbits are extremely important in the diet of the host-country population and grow the year round in many areas. Therefore, techniques differ in methods of seed-bed preparation and planting, depending on weather conditions. From this session the trainees will:

- o Develop the knowledge and skills necessary to prepare individual vegetable plots.
- o Understand and identify the numerous types of cucurbit crops grown and consumed in the host-country.
- o Have hands-on experience with land preparation, seed and fertilizer placement, manuring and watering.
- o Gain experience in plot layout and design.
- o Learn about the basics of using pre-emergence insecticides and their importance.

HAND-OUTS: #2-a Cucurbit Planting Instructions
#2-b Sample Planting Instructions

READING ASSIGNMENT: Intensive Vegetable Gardening, pp 71-74 and pp 104-107.

TECHNICAL VOCABULARY:

Cucumber
Thai melon
Pumpkin
Seed
Insecticide
Fertilizer

Hoe
Rake
Measure
Water can
Manure
Mulch

HAND-OUT #2-a

CUCURBIT PLANTING INSTRUCTIONS

1. Locate and identify your plot.

2. Clear plot of all weeds and grass.

3. Prepare plot according to hand-out.

4. Mark 4 holes evenly spaced within the 5 m.

5. Dig each hole 25 cm deep and incorporate equal amounts of manure when refilling hole.

6. Smooth and firm the top of each hole and using hoe dig shallow hole 12 cm x 24 cm x 10 cm deep.

7. Place 2 teaspoons of fertilizer (15-15-15) and incorporate lightly.

8. Scrape each side of hole about 6 cm wide and 3 cm deep.

9. Place 6 seeds on each side of hole as shown in diagram and apply furadan.

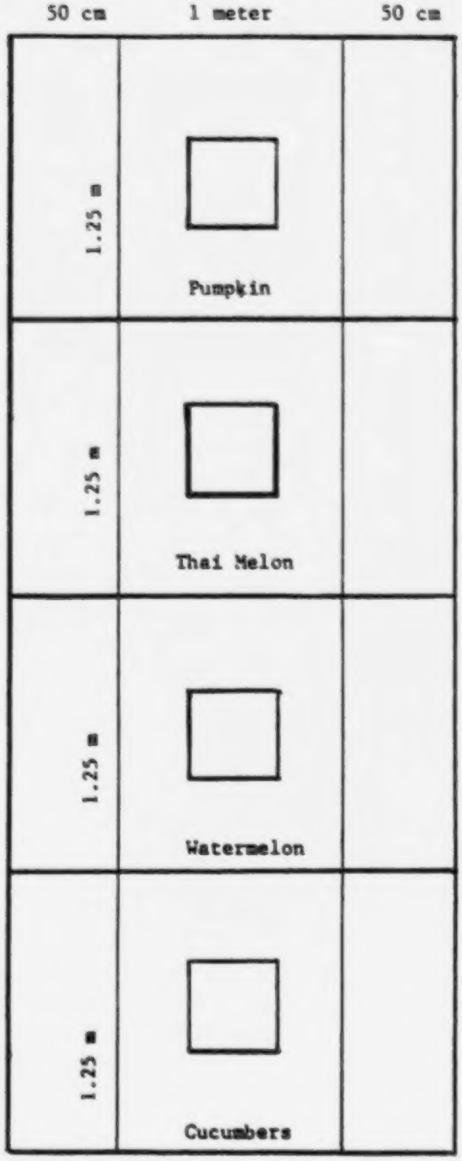
10. Cover with 1 cm of soil and firm.

11. Spread manure 1 or 2 cm thick over the water hole in a 50 cm dia circle. This is necessary as a mulch to retain moisture with this soil type.

12. Pour water, filling hole several times, until the seeded area is well soaked.

FIGURE 2 CUCURBIT PLOT

Cucurbit Plot 2 x 5 meters
Raised Bed 1 x 5 meters


50 cm
1 meter
50 cm
1.25 m
Pumpkin
1.25 m
Thai Melon
1.25 m
Watermelon
1.25 m
Cucumbers

HAND-OUT #2-b

SAMPLE PLANTING INSTRUCTIONS

PLANTING INSTRUCTIONS:

We'll be spending a lot of time in the field the first two weeks or so preparing land and planting the following crops.

DIRECT SEED

Cucumbers
Bitter gourds
Thai melons
Pumpkin
Beans
Japanese radish
Morning glory
Lettuce (broadcast)
Flowers
Parsley
Green onions
Sweet corn

TRANSPLANT

Tomatoes
Peppers
Cabbage
Chinese cabbage
Kale
Flowers

FIELD CROPS

Corn
Mung bean
Soybean
Cassava
Sweet potatoe

You'll each have your own individual plots containing the direct seed and transplant crops. In addition you will work together as a group with larger plots containing the field crops.

STOP AND THINK:

Planting is one of the most delicate and critical parts of crop production, especially with tiny seeds. Care and attention to detail really pay off. "Haste makes waste" and will give you a poor return on your time invested. Please follow the instructions carefully and do the job right the first time. Replanting is an unpleasant task.

STEP 1: MAKE A RAISED SEED BED

During the rainy season in Thailand vegetables are usually sown on raised seed beds 10-20 cm (4"-8") high. A raised seed bed makes for better drainage and prevents plants from growing in a saturated (wet feet) condition. Please take time to observe the beds that have been constructed to give you some idea of what yours should look like.

Once your beds have been constructed and shaped add manure at the rate of two shovels per sq m (see step #4) or more and incorporate into the top 10 cm (4") using your hoe. Smooth and level the top of the bed in preparation for seeding.

STEP #2: ROW LAY OUT

Lay out rows and plant seeds according to the hand-out specific to each plot.

SESSION TITLE: Plot Layout and Introduction to Metric #1

SESSION #3 WEEK #1 DAY #1 (3-1-1)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 F/C

INTRODUCTION: SESSION OBJECTIVES

This session on "Plot Layout" is designed to introduce trainees to methods and techniques for plot site selection and layout. They are also introduced to the metric system. From this session the trainees will learn the basics of the following:

- The metric system.
- How to select a garden plot site.
- How to lay out a selected site to gain the maximum from slope for drainage, light, water availability and soil conservation.
- How to lay out plots with square corners using the triangle method. This is best done in trainee pairs. For practice, trainees also lay out and mark one of the next plots they will plant.

HAND-OUTS:

#3-a	Measurement Instructions
#3-b	Measurement Diagram
#3-c	Instructions for Plot Measurement
#3-d	Host-Country Units of Measure
#3-e	Area Measurement
#3-f	Common Units of Measure and Conversions
#3-g	Conversion Table

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Lay out
Measure
Slope
Square
Right angle
Corner

Stake
String
Lime
Drainage
Soil conservation

HAND-OUT #3-a

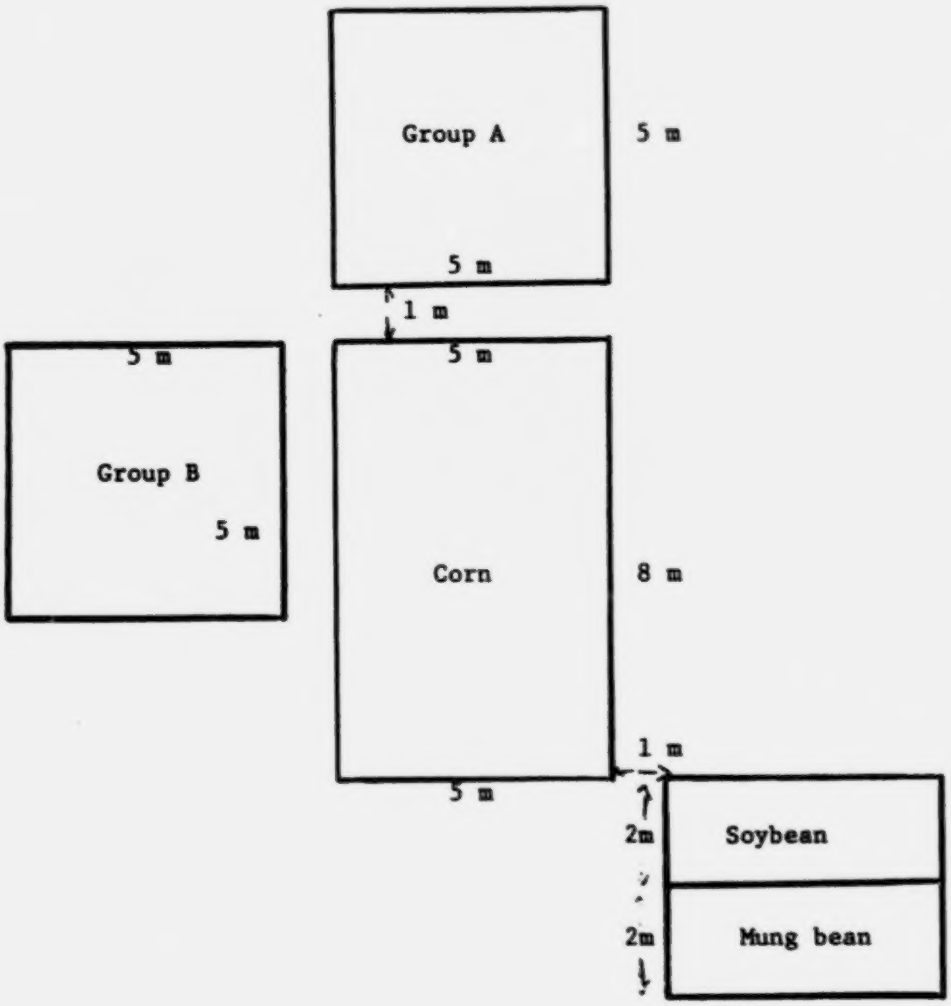
MEASUREMENT INSTRUCTIONS:

1. Each group takes materials needed to measure plots.
   - 4 corner stakes
   - Hammer
   - String
   - 1 meter and 5 meter measurement sticks
   - Right angle frame (3:4:5 ratio).

2. As a group follow the diagram.
   - Put first stake at one corner, 1 meter from the corn plot stake.
   - Run the string down 5 meters parallel to the corn plot and put another stake at the end, 1 meter from the corn stake.
   - At either stake make the right angle with one method. (i.e. using right angle frame) and follow the right angle.
   - Stake another 2 corners to make 5 x 5 sq m plot.
   - Run the string or tape between each stake.
   - Lime the borders.

HAND-OUT #3-b

FIGURE 3 MEASUREMENT DIAGRAM


Group A
5 m
5 m
1 m
5 m
Group B
5 m
5 m
Corn
8 m
1 m
5 m
2m
Soybean
2m
Mung bean

HAND-OUT #3-c

INSTRUCTIONS FOR PLOT MEASUREMENT (12 of 1 x 5 sq m plots)

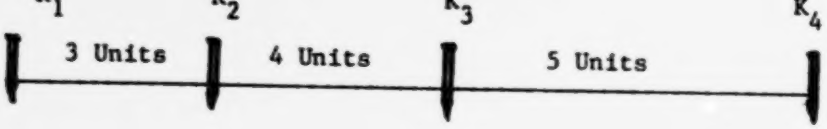
1. Start at first corner on the north. Put a stake in there. Leave a 1 meter path between your plot and the first demonstration plot.

2. Use measurement tape and measure 5 meters parallel with the demonstration plot and put another stake down. Tie colored string between the 2 stakes so you can see the line.

3. From first stake make a right angle (90 degree) with the string between the first 2 stakes. You can use one of these methods:

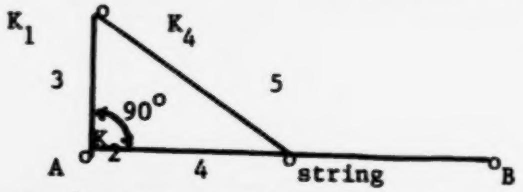
3.1 3-4-5 method.

- Take one string and divide it into 3 parts, having a 3:4:5 ratio of lengths. Tie the knots and stakes to each point. (K1, K2, K3, K4) as in the picture.



- Put stake K2 on the same spot with the first corner stake and K3 parallel to the string.

- Try to get K1 and K4 on the same spot and that will make a 90 degree angle.



3.2 If you have a ready-make triangle, use that and follow the line.

4. Start from first stake (A). Take measurement tape an . go down to the other end of the plot. At 23 meters put stake C. down.

5. Along the measurement tape put stakes in every 1 meter.

6. Do the same with the other end and that will make 12 plots of 1 x 5 sq m with 1 meter paths between each plot.

HAND-OUT #3-d

THAI UNITS OF MEASURE

AREA

1 rai = 1,600 sq. meters = 4 ngaan
1 ngaan = 400 sq. meters
1 taaraang waa = 4 sq. meters
1 rai = 0.4 acre

LENGTH

12 inch = 1 khuup
2 khuup = 1 sauuk
4 sauuk = 1 waa
20 waa = 1 sen
400 sen = 1 yoot
* 1 meter = 2 sauuk
* 1 km. = 25 sen

WEIGHT

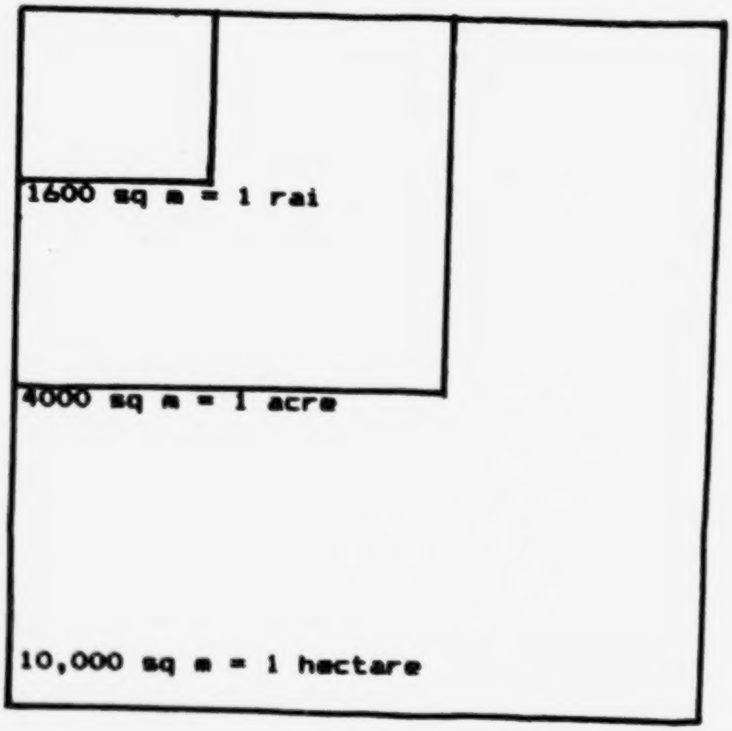
4 salung = 1 baht
4 baht = 1 tamlung
20 tamlung = 1 chang
50 chang = 1 haap
* 15 grams = 1 baht
600 grams = 1 chang(luang)
60 kg. = 1 haap

VOLUME

20 thanaan = 1 thang
50 thang = 1 ban
2 ban = 1 kwian
* 1 liter = 1 thanaan
20 liter = 1 thang
2,000 liter = 1 kwian

HAND-OUT #3-e

AREA MEASUREMENT


1600 sq m = 1 rai
4000 sq m = 1 acre
10,000 sq m = 1 hectare

LENGTH

100 cm 1 meter

90 cm 1 yard

30 cm 1 foot

1 mile

0.625 mile 1 kilometer

HAND-OUT #3-f

COMMON UNITS OF MEASURE AND CONVERSIONS

AREA

1 hectare = 10,000 sq. meters = 2.47 acres = 6.25 rais

1 acre = 4,000 sq. meters = 4,840 sq. yards
= 43,500 sq. ft = 0.4 hectares = 2.5 rai

1 rai (Thai) = 1,600 sq. meters = 0.4 acre

LENGTH

1 meter = 100 cm. = 1,000 m.m. = 39.37" = 3.28 ft.
1 cm. = 10 m.m. = 0.4 inch
1 inch = 2.54 cm. = 25.4 m.m.
1 km. = 1,000 m. = 0.625 miles
1 mile = 1.6 km. = 1,600 m. = 5,280 ft.

WEIGHT

1 kilogram = 1,000 g. = 2.2 lbs. = 35.2 oz
1 pound = 16 oz. = 454 g. = 0.454 kg
1 ounce = 28.4 g.
1 metric ton = 1,000 kg. = 2,202 lbs.
1 U.S. ton = 2,000 lbs.

Rule of Thumb - Kg/ha = Lbs/ac

VOLUME

1 liter = 1,000 c.c. = 1,000 ml.
1 gallon = 3.78 liters = 3,780 cubic centimeters

TEMPERATURE

C degree = (F degree - 32) x 0.55
F degree = (C degree x 1.8) + 32

HAND-OUT #3-g

CONVERSION TABLE

Lbs/Ac	Kg/ha	Kg/Rai
10	11.2	1.8
20	22.4	3.6
30	33.7	5.4
40	44.8	7.2
50	56	9
60	67.4	10.8
70	78.6	12.6
80	90	14.4
90	101	16.2
100	112.3	18
110	123.5	20
120	134.7	21.6
130	146	23
140	157	25
150	168.4	27
160	179.6	28.7
170	191	30.5
180	202	32.3
190	213	34
200	224.5	35.9
210	235.8	37.7
220	247	39.5
230	258	41.3
240	269.5	43
250	280.7	44.9
260	291.9	46.7
270	303	48.5
280	314.4	50.3
290	325.6	52
300	336.8	53.9

HAND-OUT #3-g (CONTINUED)

CORN

CONVERSION TABLE

Bu/ac	Lbs/ac	Kg/ha	Kg/Rai
200	11,200	12,575	2,012
190	10,640	11,945	1,911
180	10,080	11,317	1,811
170	9,520	10,688	1,710
160	8,960	10,060	1,610
150	8,400	9,431	1,509
140	7,840	8,802	1,408
130	7,280	8,173	1,308
120	6,720	7,545	1,207
110	6,160	6,916	1,106
100	5,600	6,287	1,006
90	5,054	5,659	905
80	4,480	5,030	805
70	3,920	4,401	704
60	3,360	3,772	604
50	2,800	3,144	503
40	2,240	2,515	402
30	1,680	1,886	302
20	1,120	1,257	201
10	560	629	101

SESSION TITLE: Meet Center Director and Staff

SESSION #4 WEEK #1 DAY #1 (4-1-1)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

The Center's Director and staff are introduced to trainees. The Director gives an overview of agricultural education in Thailand- the context in which Crossovers do their agricultural work. The importance of using a resource like the Center is also pointed out to trainees. When trainees are introduced to the Center's Director, not only do they have an opportunity to hear from the Director about about host-country agricultural education, but they have an opportunity to practice greeting people of superior rank and to observe how respect is paid to those with authority.

Objectives are:

- For trainees to recognize people they will be seeing during training.
- To introduce trainees to agricultural education in Thailand, through an explanation of the Training Center's purpose.
- To satisfy, observe and participate in protocol.

HAND-OUTS: none

READING ASSIGNMENT: none

TECHNICAL VOCABULARY: none

SESSION TITLE: Livestock Orientation and Overview

SESSION #5 WEEK #1 DAY #1 (5-1-1)

PRESENTER:

CO-FACILITATOR:

TIME: 15:00-16:30 F/C

INTRODUCTION: SESSION OBJECTIVES

Livestock play an important part in everyday village life. One kind of animal or another is connected with each household. Therefore, the opportunity to improve animal type and/or production techniques, feeding, breeding and care is unlimited. Animal projects are also easy for trainees to develop on site; therefore, this session allows the trainees:

- To become familiar with the major components of animal production and practices under good management conditions.
- To have hands-on experience with every aspect of raising animals -- from buying to marketing.
- To understand the livestock training objectives and their relevance to the trainees expected role in the host-country.
- To personally handle several types of livestock.

HAND-OUTS:
#5-a Overview of Livestock Training
#5-b Small Animal Production Assessment Tool
#5-c Livestock Production Planning

READING ASSIGNMENT: Hand-outs above.

TECHNICAL VOCABULARY:

Chicken
Pig
Cow
Chicken cage
Pig pen
Cattle pen
Breed
Broiler
Egg
Beef cow
Dairy cow

HAND-OUT #5-a

OVERVIEW OF LIVESTOCK TRAINING

Livestock training is designed to establish a basis for making the management decisions called for in the development of livestock operations. Because there are no absolutes in animal husbandry, our first goal is for you to learn that, in a complex system based on locally available resources, there are very few instant technological innovations that are truly effective. For this reason, the training is developed within a framework or continuum of development reaching from high technical production levels to the free range survival level. Within this developmental continuum, training focuses on the five principal categories of livestock development:

1) Nutrition,
2) Management,
3) Diseases & Parasites,
4) Genetics, and
5) Housing.

Most emphasis is placed on nutrition, the beginning and end of all livestock operations. (75% to 90% of the cost of raising animals can be feed). The health of the herd and the profit or loss for the farmer are all directly controlled by the nutrition and feeding of the animals. Nutrition is the most limiting factor in livestock development and therefore is the area that volunteers must develop before changing breeding stock or management levels.

The training manual/guidelines take the approach that in order to develop a profitable livestock operation all five of the categories must be balanced on the same level of the continuum. This balancing point on the developmental continuum is determined by a host of factors including markets, pricing of feeds and meat, local infrastructure, water quality, cultural tastes in meat, credit, agricultural extension, government policies, management levels, diseases, vaccines, medications, parasites, and locally grown animal feeds.

Therefore, when trainees learn the mechanics of a given technique (such as debeaking of chickens), they also must consider the context in which the practice will be employed. To determine the appropriateness of a given practice or technique, you should constantly ask:

- Is this practice consistent with local management levels and resources?
- What are the potential risks for the farmer?
- Will it increase profit?
- Are the risks for potential loss too great to justify the potential gain?
- Long term effects on the livestock operation?

HAND-OUT 5-a (CONTINUED)

The training program provides an integrated approach to technical information and ability as well as skills needed for animal projects at your sites. You will learn skills through an experiential training methodology implemented through intensive, "hands-on" learning. Sixty percent of the technical time is spent working with the animals and 40% in the classroom. The trainees are responsible for the daily feeding, watering, and caring for the animals.

The Role of the Volunteer in Small Animal Projects:

Successful animal projects (e.g. ones that make money for the farmer) are projects in which the five components of animal raising (breeds, nutrition, disease, management, and housing) either match or balance in the level of development and production.

The chart on the next page explains the concept of High Management vs Low Management on the development continuum.

Why Some Animal Projects Fail:

The degree of success of any animal project must have all the components match; that is, you cannot have one component in a low level of production while the rest of the components are [illegible] high levels of production.

Example:

A project has a supply of exotic [illegible]ds, a sophisticated disease control program, [illegible] housing, and management. Unfortunately there is not [illegible] good source of nutritious feed in the area. This project will fail because the nutrition component does not match the other components. The animals will never reach their genetic potential because of a poor diet. And this poor diet will stress the animals to such a point that disease would eventually become a problem. Nutrition is usually the most limiting factor in animal projects. No matter what the genetic sophistication of the animal is, the animal must have the proper diet for its production purpose.

On the other side of the spectrum, if a project consists of using well balanced feed on native/country animals, it would probably fail also. Although a well balanced feed would be better than table scraps, the native animal does not have the genetic potential to produce meat, eggs, milk, etc. to make cost of the feed justifiable. In other words, the animal cannot utilize the feed efficiently.

HAND-OUT #5-a (CONTINUED)

High Management vs Low Management on the Development Continuum

Animal Raising Component	High Level Production	Low Level Production
1. Breeds	Animals genetically selected for efficient production of meat, eggs, milk: exotic, hybrid breeds.	Animals naturally selected for survivability e.g. "survival of the fittest"--- selection for agressiveness through exposour to predators: Native/ Country Chickens.
2. Nutrition	Animals fed a well balanced, scientifically determined feed in order to reach genetic potential.	Animals fed scraps and/or scavenge for food on their own; a well balanced diet not always assured, less meat and eggs, slow growth.
3. Disease	Prevention due to a high degree of sanitation, isolation, quarantine, use of vaccines and antibiotics for treatment.	Prevention due to animals that survive a disease outbreak. Over a period of time a natural resistance is developed. Survivors become hardier and more resistant to pathogens.
4. Management	Animals receive considerable amount of supervision/care, e.g., constant availability of water, feed. Record keeping.	Animals care for themselves with minimum care from owner. They develop survival characteristics.
5. Housing	Confinement, controlled environment, light, temperature, ventilation.	Free range or partial shelter usually exposed to the elements.
6. Degree of Investment	High with optimum returns if all components/production factor controlled.	Low investment, low return, animals are not bred & raised for production purposes.

The examples mentioned are typical situations and reasons why development projects fail in developing countries. Planners either fail to look at the project in terms of the component package where all five components must be at the same levels or they feel that any one of the components (because it originates from a developed country) is better than none at all.

Advantages of Country/Native Breeds:

A good example of the latter situation is when exotic breeds of chickens are introduced into a village setting. Here the village breed has the advantage over the hybrid, especially if the village has no vaccines available or hatcheries to incubate eggs artificially. The exotic breeds have no natural resistance to disease in the area. Their aggressiveness has been bred out, so if they are free ranged, they are at the mercy of predators. And, if these hybrids have been selected for egg laying, broodiness has been bred out. Broodiness is the instinctive behavior chickens exhibit when they stop laying and sit and hatch their eggs.

The chances of these exotic breeds to survive are minimal. They will either be killed by disease or predators, or fail to reproduce offspring. It is important for the development worker to realize that improved scientific systems are not always appropriate for some situations.

The Development Worker Skills:

The extension/development worker must be able to determine, assess, and evaluate the systems of animal raising and production that he/she will find somewhere between the high level production system and the low level or survival level of production system. This ability or skill does not necessarily arise from having a technical background in animal raising. Information which can be readily available from a government office or library in the developed world may not be so accessible in a village in Africa. Skills in communications, information gathering and filtering, and community entry will be needed by the development worker in order for him/her to assess the local situation, evaluate resources and determine management systems in a particular area.

This can be a very slow and patience developing process. It can also be an enjoyable way of learning about a new place, its people and culture. Once these skills are utilized, only then can the development/extension worker determine if change that is desired by the farmer is appropriate and can be implemented successfully.

Credibility Techniques:

The Practical Poultry Raising Manual (ICE M-11) describes this (see page 16) as determining the gap and trying to fill it. The gap is what is between the production potential and the present situation. Once it has been determined that change is possible and appropriate, it is best to introduce it in small increments, especially those most easily understood by the farmer and those which show the quickest results and cost the least. These increments of change are sometimes called credibility techniques, because if done correctly, they help build confidence between the development worker and the farmer. With this confidence, larger increments of appropriate change can be introduced. The farmer can gradually have more control over his production components and move his management system on the development continuum towards an improved system, appropriate for his needs and desires.

HAND-OUT #5-b

SMALL ANIMAL PRODUCTION ASSESSMENT TOOL

1. Introduction
2. Assessment Questions
3. Some specific considerations for raising poultry and swine.

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1. INTRODUCTION

Because of the potential for long-term effect on community nutrition and economy, small-scale animal production can be projects which are among the most satisfying of volunteer activities.

The small animal production resource packet should help you decide on the best animal project for your community. Your personal preferences should also be considered, of course. But the key to long-range success with your project is a combination of two basic points: 1) the project must meet local needs, and 2) it must achieve local support.

Choosing the project that will have the most positive impact will require careful observation, endless legwork, and nonstop questioning. This assessment tool raises basic issues and suggests some key questions to help you direct your investigation.

There are many variables to consider when deciding on an animal project, especially in a Third World context. Your position in your community and the opportunity to observe over time gives you an important advantage in judging the feasibility of the project. Your example and influence can have immediate and long-range impact. You may become involved in improving local stock, or you may try to introduce new animals or new uses for existing protein sources. Concentrate on making sure the project is intrinsically viable and valuable to the local target group. The adage, "Give me a fish and I eat for one day. Teach me to fish and I'll eat every day," is particularly appropriate to small animal projects. A logical and vital addendum is "Teach a mother and you teach a whole family." Do not ignore the long-range impact that your work may have on women. The linkage to health and nutrition programs, to cooperatives, and to other forms of economic development could be very effective.

Tips on Information Gathering:

Information gathering techniques are covered completely in Community, Culture, and Care, by Ann Templeton Brownlee (available through ICE) but in very general terms:

1. Gather your information first hand.
2. To develop a wide network of contacts and an overall picture, ask many sources.
3. Concentrate on cultural similarities, not differences.
4. Ask questions that get people thinking in a positive way.

2. ASSESSMENT QUESTIONS

RATIONALE

Note: When a project meets local needs and achieves local support, it will be considered successful and become self-perpetuating.

1. Why do you want to attempt a small animal project?
2. What community needs will be fulfilled?
3. What factors in the community point to the success or failure of a particular animal project?

SITE

Note: Being thoroughly familiar with a community and its problems will ensure a sensitive approach to meeting the needs of the local population.

1. What climatic/seasonal factors, such as ranges in temperature, rainfall, humidity, food or water shortages, etc., may have an impact on small animal projects?
2. What local or country-wide policies might have an impact on the project?
3. What predators or insects might have a negative impact on the project?

PEOPLE

Note: Understanding the cultural and work patterns in the community will provide insight into how best to achieve an effective program.

1. Who is the target group? Is that group likely to support a small animal project? Why or why not?
2. Who is likely to support the project? For what reasons?
3. Who will benefit? In what ways? Will that insure long-term success?
4. Who are the traditional animal raisers? Why? What are the time constraints on this group?
5. Who are the influential economic leaders in the community?
6. How will the family or community structure be affected?
7. What local conditions, such as religious beliefs, migration patterns, etc., might help or hinder this project?

ECONOMICS

Note: An animal project that is income-generating is very likely to succeed.

1. What is the basic type of economy in the area (e.g., agricultural, pastoral, semi-industrial, etc.)?
2. What is the level of development of that economy? What are the strains on the local economy (e.g., crop failures, poor marketing system, etc.)?
3. What are the time and work requirements of the target group?
4. What is the average income level of the target group (or level of the source of money of the target group)?
5. What amount of capital outlay for projects could most members afford easily? What strains will small economic gains or losses have?

HAND-OUT #5-b (CONTINUED)

ANIMAL

Note: A thorough investigation of the level and scope of the production of existing animals will uncover

1. What is the quality of the existing local stock?

many factors that may limit or enhance success.

1. What is the quality of the existing local stock? Is there potential for improving that stock through cross-breeding?
2. How and where are these animals raised? (e.g., run loose, in cages, pens)
3. Under what conditions are they raised? Is there adequate food, water, sanitation?
4. Why are those animals raised? (e.g., for food, sources of ready cash, for gifts, for special occasions, investment, etc.)
5. Why aren't certain animals raised? Are there any special beliefs, rules, preferences, or prejudices concerning food from certain animals? Foods that various categories of people should or should not eat? Times when and ways in which certain foods should or should not be eaten? Special ways in which food should or should not be prepared? Foods believed to cause sickness or misfortune, separately or in certain combinations?
6. Do the local people eat the animals they produce?
7. Do they sell the animals? Where?

ANIMAL FOOD AND WATER SUPPLY

Note: The limiting factor in most animal projects is the non-availability of animal feed.

1. What food crops are easily available?
2. What could be fed to animals?
3. What do local people use to feed their animals?
4. Are bulk purchases of animal food possible?
5. Are special concentrates, vitamins, or mineral supplements easily available? Affordable?
6. Is clean, fresh water easily available?
7. Are salt blocks available?

MARKETS

Note: Access to markets is an important consideration.

1. What outlets or markets are accessible?
2. What demand would there be for any animal or food product locally?
3. What potential markets exist for by-products?
4. What preferences in purchasing do marketers demonstrate (i.e., lean meat, fatty meat)?
5. What shipping and sanitation problems need to be addressed if distant markets are to be feasible?

LOCAL TECHNICAL SUPPORT

Note: Technical advice from experienced local people will help prevent costly problems.

1. Who could be a resource person for technical advice (i.e., agricultural extension agent, veterinarian, experienced animal raiser, teacher, AID specialist)?
2. Who is attempting a similar project? Is it possible to collaborate?
3. Has a similar project been tried unsuccessfully? What were the reasons for the failure?
4. Who can give demonstration of practices and techniques that have been successful in that locale?
5. Who can supply healthy breeding stock?
6. What organizations in your country are involved in similar projects?
7. What government support is available for subsidies, if necessary?

PERSONAL TRAITS AND BIASES

Note: Consider your personal motivation in starting a small animal project.

1. What kinds of personal experience with animals do you have to draw upon (e.g., pets, farm background, school projects, part-time work)?

   Carrying water? Locating food supplies?

   Building shelters?

   Fighting diseases?

   Fighting predators?

   Doing clean-up?

   Slaughtering?

2. Are you a good manager? Will you be responsible for the feeding, breeding, and record-keeping of your animals?

3. Can you instill that responsibility in your target group?

4. When it comes time for slaughter, will you be able to do demonstrations? Will you be able to prepare the food and promote its value to others?

5. Are you willing to do a limited backyard project on your own to test out your choice of animal?

6. Are you willing to invest the time in answering all the assessment questions?

LONG-RANGE IMPACT

Consider the possible long-range benefits or liabilities in your planning.

LIKELY BENEFITS

Increased source of protein.

Cash source.

Higher yield through improved management techniques.

Source of by-products.

Labor intensive.

POSSIBLE LIABILITIES

Negative environmental impact

Negative cultural impact.

Financial risk.

Time commitment (for you and the local animal raisers)

3. SOME SPECIAL CONSIDERATIONS FOR POULTRY AND SWINE

POULTRY

POSITIVE CONSIDERATIONS

Diet supplement and/or cash source.

Possible to raise meat birds or layers.

Rich fertilizer by-product can be collected easily if housing exists.

Possible to cultivate and use grain not consumed by humans for feed.

Benefits (better nutrition, extra income) are easily seen.

POSSIBLE PROBLEMS

Poor management techniques are common.

Poor breeds hamper good production.

Securing adequate feed and supplements may be difficult.

Capital investment for housing, especially for small producers, is sometimes economically unfeasible.

Chickens are very disease-prone.

Chicken-raising is looked down on in some cultures/communities.

Eggs are sometimes taboo.

SUGGESTIONS:

Observe market supply and demand; identify peak periods. Ascertain what causes these fluctuations. Locate housing or materials for construction. Housing is a definite aid to disease control.

HAND-OUT #5-b (CONTINUED)

Decide on an emphasis of production. Meat birds (broilers) can be marketed in ten to twelve weeks. Layers can begin production after twenty weeks.

Be sure that any project is economically feasible from the producer's point of view.

SWINE

POSITIVE CONSIDERATIONS

Small-scale project can be low-risk and short-term but show impressive gains. Model projects can have a big impact on production techniques.

All parts of the pig can be eaten or used.

POSSIBLE PROBLEMS

Religious beliefs make hog production unacceptable to some areas.

Availability of proper feed is crucial for best production. Corn is best but the by-products of other grains are also possible.

Hogs are disease-prone; internal parasites are common; innoculations are necessary. An agricultural extension agent or veterinarian needs to be involved to prevent losses through disease.

Male pigs need to be castrated to produce meat of better flavor. This may be culturally unacceptable.

Meat can cause illness if not thoroughly cooked or cured.

Hogs need a salt supply and vitamin/mineral additives to basic rations.

SUGGESTIONS:

Keep project small. Financial risks are high due to the high costs of foundation stock.

Build a demonstration farrowing stall to show simple technique and positive impact on production.

HAND-OUT #5-c

LIVESTOCK PRODUCTION PLANNING

Nutrition is the most important component of the five components that form livestock development. If a volunteer is working towards improving productivity in livestock production with small farmers then he or she must first work to improve the feeding of their animals. However, the volunteer often lacks the technical skills needed and an adequate knowledge of the community agricultural environment to know if an improvement in productivity is possible or desired by local farmers. We cannot over-emphasize the importance of working with local farmers in order to understand their husbandry practices, their reasons for their management decisions, and to gain knowledge of local conditions.

If productivity is to increase, there are a myriad of factors to consider, but nutrition and feeding are the first steps. The volunteer must conduct an exhaustive survey of all locally grown feeds. The volunteer should answer these questions: What are the animals fed currently? Is there an abundant supply all year round? Are there storage problems? What are the nutrient values of these feeds? Is it grown locally? What is the market value of the feed? Is there a surplus or shortage? Are there any other low cost, locally available feeds not currently being fed to animals? Why? When the volunteer has gathered complete information on every possible animal feed, then he or she should begin to balance feed rations. Try every possible combination in order to come up with as many profitable rations as possible. Since grain storage and transport may be a problem, one can not rely on a continuous supply of the same feed ingredients year round. Therefore different rations and feedstuffs will probably be used at different times of the year. If the volunteer finds a ration or rations that are inexpensive, available locally all year long, profitable for use by local farmers, appropriate for the local agricultural environment, not taking away needed grains from human consumption, matched to the four other components of livestock production on the developmental continuum, and accepted by the farmers as a good idea, then one can begin to work on improving local livestock production.

The next step is to become involved in a larger "community analysis" that includes infrastructure, available agricultural supplies, marketing, meat preservation, local climate, government policies & price controls, credit, pricing of meat and feeds, local taste in meat, and who will gain the most from the increased production. We will examine each of these points separately.

HAND-OUT #5-c (CONTINUED)

INFRASTRUCTURE:

Is there adequate shelter for the animals? How are the roads between you and your market? Passable year round? Is the transport you need available? How will transport cost affect profit? Is there adequate water for drinking by your larger herds? Are your animals on private land or public domain?

AVAILABLE SUPPLIES:

Are the vaccines and antibiotics you need available? Are they prohibitively expensive, scarce, or of low quality? Is there a good hatchery in the area? Are there low cost laboratory testing and medicines available?

MARKETING:

Will you sell to local butchers or slaughter and sell the meat directly? Will it be sold in the village or taken to the regional markets? When is the most lucrative time to sell? Is the market controlled by middle men or women? If so, how does that affect profit?

PRESERVATION:

Will the animal be sold live or as meat? If as meat, how will it be preserved? Salted? Smoked? Eaten fresh? Frozen? Refrigerated? Sun dried? Be sensitive to local custom on this because people's culinary habits are not going to be changed by you and you could lose money for the farmers you are working with.

LOCAL CLIMATE:

Expect the worst. What effect would a drought have on the production? Insect attacks? Excessive rainfall? Flooding? Crop failures?

GOVERNMENT POLICIES AND PRICE CONTROLS:

Are the costs of feeds or meat regulated? By whom? What are their policies? Will this affect your profit? Are there government policies for quarantine during disease epidemics? Is there a local agricultural extension agent? Can he be of service to you or the local farmers you are working with? Does the government offer low interest agricultural loans?

HAND-OUT #5-c (CONTINUED)

PRICING OF MEATS AND FEEDS:

Who sets the prices? Are you free to set your own? Can you make a profit based on current local prices of meat and feeds? (We will deal extensively with this question during our management planning classes).

LOCAL TASTE IN MEATS:

Is a dark, tougher meat preferred to a light, softer meat? Be sure to produce the type of meat with the flavor preferred locally and butchered in the local manner or people will not buy it.

WHO WILL GAIN?:

Finally, who in the community will gain the most from your work in increasing livestock production? What if you help the wealthy cattle rancher to increase his herd production and yet the price of beef makes it unavailable to the poor? Yet, can you help the poor who lack the land, feed, and other resources needed to improve livestock production?

Once you feel you have the answers to all of these questions and a clear understanding of local conditions, your two years will probably be done. However, if you have any time left, make sure you balance the production level of your feed ration (high, moderate, survival) with the production level of your herd or flock in genetics, diseases and parasites, management, and housing. We will discuss the balancing of the five components on the same production level at length in our management planning classes.

THE PITS:

Listed below are seven common pitfalls that volunteers in livestock production often encounter. In an attempt to keep all of you out of the pits (some of which we found ourselves in), we are listing these. Our intent is to get your curiosity going and get you thinking, since we can not provide answers that we do not have. We will take time in class to discuss these points.

1. They attempt to improve livestock production without improving the diet of the animal. Grave mistake.

2. They introduce improved (exotic) breeding stock that have been bred for high production into survival production environments.

HAND-OUT #5-c (CONTINUED)

3. They do demonstration work with livestock through different institutions (such as schools or 4H clubs) and base their project on shielded, false economies that a farmer can not duplicate since he or she does not have the same resources. The alternative is to work in real development with farmers.

4. They place their projects into direct competition with humans by feeding grains to animals in villages where the people lack protein.

5. They start to work too soon - before they gain understanding of local culture, language, and the agricultural environment of their village. This can produce disaster.

6. They do not match all five components of livestock production (nutrition, management, diseases and parasites, housing, and genetics) at the same level of production.

7. They assume that an increase in production is always possible. Furthermore, they forget that the first objective of the small farmer is not to maximize production, but rather for the animal to survive.

SESSION TITLE: Planting Maize

SESSION #6 WEEK #1 DAY #2 (6-1-2)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

INTRODUCTION: SESSION OBJECTIVES

Many varieties of maize are grown in the host-country and contribute significantly to the economy and well-being of the population. Field corn is used for various kinds of animal feeds (which are manufactured locally throughout Thailand and make up a major export product) and is therefore an important crop. Sweet corn, on the other hand, is marketed fresh in season and is part of the diet. It also is processed as several products, including canned baby corn. For the purpose of training the trainees, sweet corn is the most important as they will have little to do with commercial crop production. Therefore, the trainees should know:

- How to prepare a proper seed bed for planting corn.
- How to select good quality seed and varieties, as well as how to test the germination.
- The difference between sweet corn and field corn including the slight differences in cultural practices.
- The proper seed spacing and depth, proper fertilizer use (and placement) and water requirements.
- Insect pests that attack corn and how to safely control them.
- The crops suitable for intercropping.
- Harvesting procedures.

HAND-OUT: #6-a Corn Planting Instructions

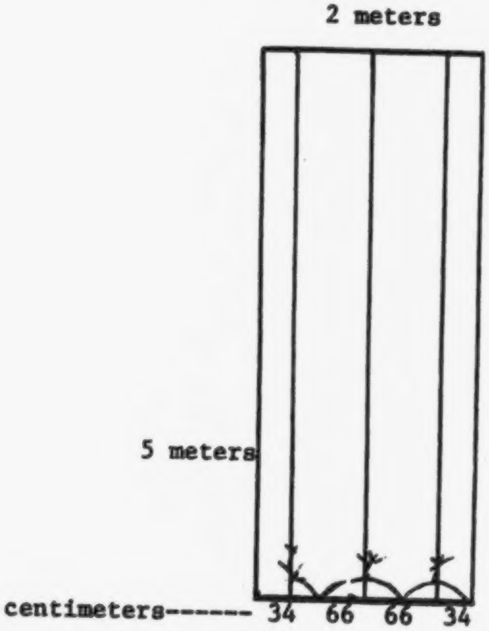
READING ASSIGNMENT: *Guide for Field Crops in the Tropics and Sub-tropics*, Pgs 62-72.

TECHNICAL VOCABULARY:
Fungicide
Manure
Hoe
Rake
Furrow
Insecticide
Sweet corn seed
Field corn seed
Water can
Fertilizer

HAND-OUT #6-a

CORN PLANTING INSTRUCTIONS

1. Make 2 x 5 m plot with 3 furrow rows the same as demonstration plot with 66 cm spacing between rows.
2. On each ridge, open up the top about 4-6 inches deep. Sprinkle 15-15-15 chemical fertilizer about 4 teaspoons per linear meter. Sprinkle furadan with a small pinch evenly through the whole row.
3. Use the hoe to mix it with the soil and cover the row within 2 cm of the top.
4. Put in 2 seeds every 25 cm (19 pairs/row).
5. Use rake to cover and firm the soil.
6. Spread manure evenly on each ridge using .5 cu ft/sq m for soil conditioning and mulching purposes.
7. Water the plot by running water into the furrows and let the water absorb into the soil.



Sweetcorn Plot (3 rows)
66 cm Row spacing
25 cm seed spacing

SESSION TITLE: Cage and Pen Construction

SESSION #7 WEEK #1 DAY #2 (7-1-2, 11-1-3, 15-1-4 & 18-1-5)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 F

INTRODUCTION: SESSION OBJECTIVES

The use of local materials along with unique building designs makes it important that the trainees have exposure to local construction techniques. This session is designed to give trainees the confidence needed to duplicate these techniques at their sites; therefore they will:

- Be introduced to the most common building materials, methods and tools used in the host-country.
- Learn some of the basic vocabulary used in construction.
- Gain hands-on experience with the methods and styles of host-country construction.
- Gain the skills and confidence necessary to repeat this exercise at their sites when developing projects.

HAND-OUTS: #7-a Enclosing a Chicken Coop
#7-b Constructing Cages for Laying Hens
#7-c Pouring a Concrete Pig Pen Floor

READING ASSIGNMENTS: Hand-outs above.

TECHNICAL VOCABULARY:

Chicken wire
Nails
Wood
Bamboo
Concrete
Bucket
Basket
Gravel and cement

Hammer
Saw
Knife
Hatchet
Measure
Lay out
Sand

HAND-OUT #7-a

LIVESTOCK CONSTRUCTION
ENCLOSING A CHICKEN COOP

1. A wooden frame is already in place for the chicken coop. It consists of boards running between building posts at the ground, middle and top levels to mark out a 3 by 4 meter room area. The boards are spaced the width of the woven chicken wire we are using. You will also notice a doorway built into the frame. We will attach woven chicken wire to this frame for a cheap and simple method to keep our baby chicks in and to keep dogs, rats and other pests out, and still allow for plenty of cooling breezes.

2. Split sections of bamboo to prepare slats about 1 meter long by 2.5 cm wide.

3. Wrap the end of the roll of chicken wire around a slat and nail the slat to the back bottom corner of the frame.

4. Unroll the wire to the corner post. Pull tightly, align correctly and nail on another slat to hold in place.

5. Go back and nail slats on the upper and lower edges to hold securely.

6. Repeat for the next section.

7. Only cut the wire when you reach the door or the end wall. At each cut leave enough extra wire to wrap several times around a slat before nailing. When you cut the wire, cut it straight across, one wire at a time using the cutting pliers provided.

8. When pen is completely enclosed, use your hoe to level the floor and plug all gaps below the bottom board. Scatter fresh bedding.

Note: If frame cannot be easily constructed at least have a solid lower edge, pull tightly and use regular wire to "sew" the middle edges together.

HAND-OUT #7-b

CONSTRUCTING CAGES FOR LAYING HENS FROM BAMBOO

1. Study Practical Poultry Raising Manual and both the wire and bamboo models provided to understand the function of the cage.

2. For all bamboo sections attached to the frame use the following procedure:

   a. Measure the length of section needed.

   b. Mark and saw a section of bamboo to that length.

   c. Split the section of bamboo in half with a heavy knife.

   d. Further split each half into 1.2 to 2.5 cm widths.

   e. Bamboo is hard and sharp. Slide a knife along all sharp edges to dull them.

   f. Drive one nail through each section into each frame piece it contacts. If the section splits when driving the nail discard and replace it. Making a small notch before you pound the nail will help avoid splitting.

   g. Saw off excess length if necessary.

3. Using the model provided attach bamboo sections to the cage frame in the following order:

   a. Floor piece by piece on alternating sides. Each piece provides spacing for the opposite side.

   b. Back wall on one side of the frame or the other with spacing provided by the opposite floor piece.

   c. Side walls.

   d. Front wall.

   e. Top, only as chickens are placed in the cage.

4. Split section of bamboo to add at base of floor to stop eggs from rolling off.

5. Split large section of bamboo for feeder and waterer and wire onto front of cages.

HAND-OUT #7-c

POURING A CONCRETE PIG PEN FLOOR

1. Use your hoe to clear the weeds and level the soil in the area of the pig pen.

2. Build a rectangular frame of heavy boards to enclose the concrete while it hardens. The top edge should be level and of the same height as the finished concrete floor. Gaps between the bottom edge of the frame and the ground should be filled with dirt or gravel to keep the concrete from escaping.

3. Cover the enclosed area with sand. Lay pieces of bamboo to form a grid on the bottom. This will help reinforce the concrete.

4. Mix 2 buckets of sand, 4 buckets of gravel and 1 bucket of cement together. Gradually add water until a sloppy mix forms. Use less water at first because it is easier to add water than the other three ingredients.

5. Pour the concrete mix into the form. Continue to mix and pour until the form is full.

6. Work the concrete into all areas at the form evenly. Level as you go use a float to smooth the surface evenly and work the air bubbles out. Roughen up the surface with a coarse broom.

7. Cover the surface with water, plastic or other material to allow it to cure slowly and strengthen. The slower it dries the stronger it will be.

8. Completely clean all tools used before the cement on them hardens.

SESSION TITLE: Preparation for Chicks

SESSION #8 WEEK #1 DAY #2 (8-1-2)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

Chickens are an important part of farm life in Thailand. They are produced in large commercial facilities as well as at the village level. This session will show trainees:

- How to brood, feed and care for day-old chicks.
- How to use the special equipment and methods necessary for day-old chicks.
- How to develop and maintain poultry production records.

HAND-OUT: #8-a Broiler Chicken Pen Record

READING ASSIGNMENT: Practical Poultry Raising Manual, pgs 41-65.

TECHNICAL VOCABULARY:

Chick
Hot
Feeder

Clean
Cold
Water container

HAND-OUT #8-a

BROILER CHICKEN PEN RECORD

Pen # _______

Date Purchased _____________ Total feed consumption __________

Date Sold _____________ Chicken breed & source __________

Day	Feed	# of chicks	Avg. Weight	Observations
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
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SESSION TITLE: Direct Seeding Principles

SESSION #9 WEEK #1 DAY #2 (9-1-2)

PRESSENTER:

CO-FACILITATOR:

TIME: 15:00-16:30

INTRODUCTION: SESSION OBJECTIVES

In this session all seeds are direct seeded. Some seeds will later be transplanted. The knowledge of how to plant different types and sizes of seed under different soil and weather conditions is extremely important in the tropics. This session is designed to show the trainees:

- The different types and sizes of the common seeds used in the host-country.
- The effects of over/under planting and the importance of proper plant populations.
- The proper depth at which seeds of different sizes and varieties should be planted and how depth affects emergence and production.
- The technique of calculating seeding rates in conjunction with seed germination testing.

HAND-OUT: #9-1 Direct Seeded Vegetable Instruction.

READING ASSIGNMENT: Intensive Vegetable Gardening ,
pgs 104-109.

TECHNICAL VOCABULARY:

Seed
Depth
Spacing
Thinning
Soil texture

Calculate
Germination
Emergence
Soil crusting
Soil moisture

HAND-OUT #9-a
DIRECT SEEDED VEGETABLE INSTRUCTION

1. Prepare seed bed 1x5 m according to hand-out.

2. Level and mark rows acc ording to hand-out.

3. Make small furrows 1-2 cm deep following seeding depth instructions in hand-out.

4. Place seed in furrow using the following spacing:

   a. Beans - 1 seed - 10 cm.
   b. Japanese radish - 1 seed - 2 cm.
   c. Morning glory - 2 seeds - 1 cm.
   d. Lettuce broad cast - 1 seed - 10 sq cm.
   e. Flowers - 1 seed - 2 cm.
   f. Parsley - 1 seed - 1 cm.
   g. Flowers - 1 seed - 2 cm.

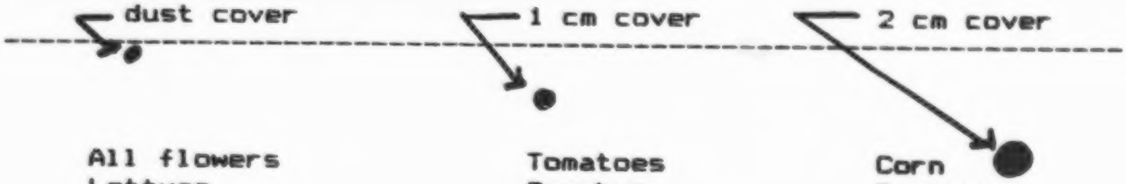
5. Apply furadan approximately one pinch per foot (30 cm) of row.

6. Cover with soil one or two cm depending on seed size.

7. Spread manure between the rows at the rate of .5 cu ft per sq m and incorporate lightly.

8. Water lightly using sprinkler can daily until seed emergence which will be 4-7 days.

RECOMMENDED PLANTING DEPTH FOR SMALL, MEDIUM AND LARGE SEEDS.



All flowers
Lettuce
Parsley

Tomatoes
Sorghum
Mung beans
Onions
Radishes
Morning glory
Kale
Cabbage
Peppers
Turnips
Eggplant
Cucumbers
Thai melon
Bitter gourd
Pumpkin
Sun Flower

Corn
Soybean
String bean
Dry bean
Peanuts

SESSION TITLE: Planting Direct Seeded Vegetables

SESSION #10 WEEK #1 DAY #3 (10-1-3)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

INTRODUCTION: SESSION OBJECTIVES

All small vegetables are started from seed -- whether they be field plantings or nursery bed plantings that will later be used as transplants. Therefore, it is important that the trainees know and understand the importance of the many aspects of direct seeding that can improve the success of growing vegetables. The objectives of this session will give trainees knowledge of:

- o How to construct a raised seed bed suitable for growing vegetables in the host-country.
- o The different methods for growing each type of vegetable in different areas of the host-country.
- o The proper use of insecticides and fungicides for controlling insects and diseases.
- o How to use fertilizers and manure for maximum production.
- o How and when to water each type.
- o How plant populations are important and seeding depth can be a factor in the success of direct seeded vegetables.
- o When each vegetable will be ready for harvest and how to harvest.

HAND-OUTS: #10-a Plot Layout
#10-b See #9-b Direct Seeded Vegetable Instructions

READING ASSIGNMENT: Intensive Vegetable Gardening,pgs 104-109.

TECHNICAL VOCABULARY:

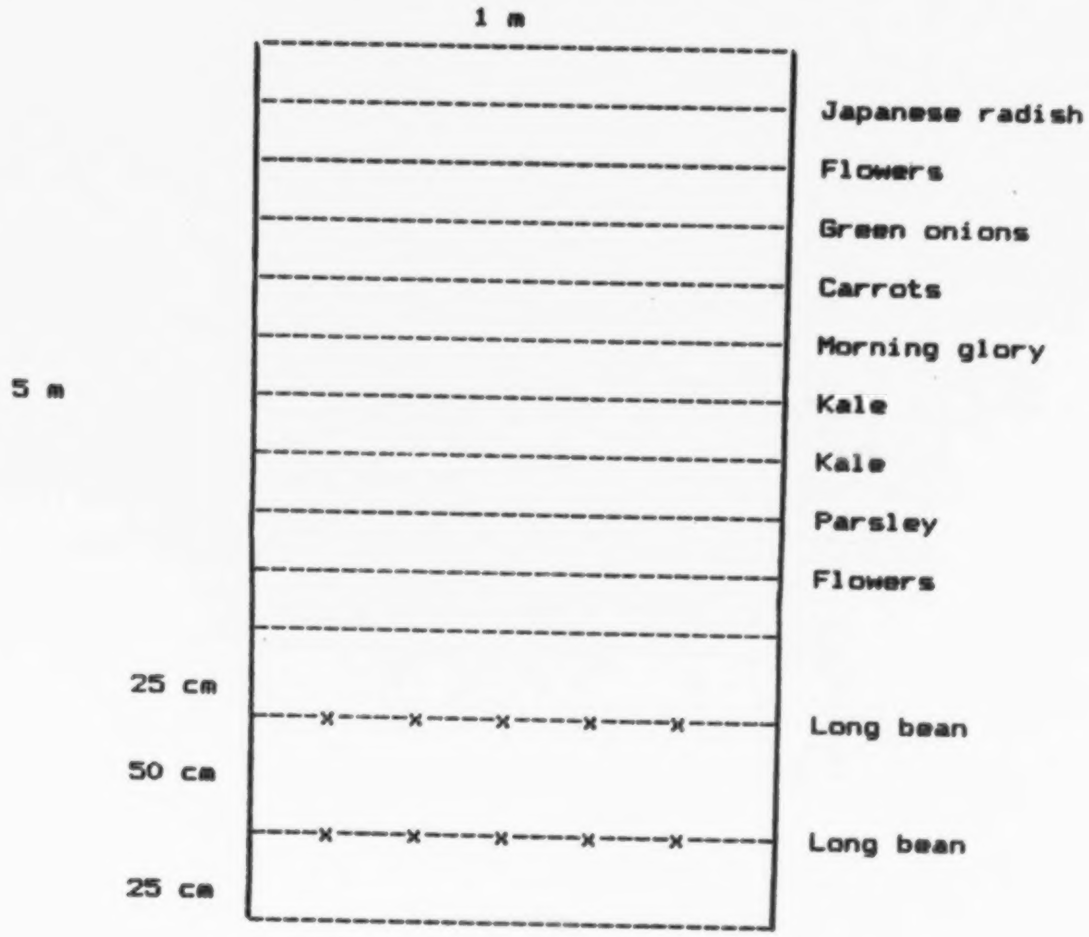
Seed
Hoe
Rake
Fungicide

Manure/compost
Broadcast
Measure stick
Vegetable names

Insecticide
Soil
Water can

HAND-OUT #10-a

DIRECT SEEDED VEGETABLES PLOT LAYOUT


1 m
Japanese radish
Flowers
Green onions
Carrots
Morning glory
5 m
Kale
Kale
Parsley
Flowers
25 cm
Long bean
50 cm
Long bean
25 cm

SESSION TITLE: Cage and Pen Construction

SESSION #11 WEEK #1 DAY #3 (11-1-3)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 F

This is the second two-hour session building cages and pens. (See Session # 7-1-2 for details and objectives.)

SESSION TITLE: Preparation for Pigs

SESSION # 12 WEEK #1 DAY # 3 (12-1-3)

PRESSENTER:

CO-FACILITATOR:

TIME : 11:00-12:00 F

INTRODUCTION:

Pigs are raised in most villages in Thailand and are used as site and village projects. Therefore, it is important that trainees know the basics of pig raising and care. In this session they will:

- Be encouraged to accept the responsibility for selection, care and feeding of pigs.
- Learn how to keep production records and appreciate their importance.

READING ASSIGNMENT: Small Scale Pig Raising, Pages 45-62.

TECHNICAL VOCABULARY:

Pigs	Water
Pen	Feed

HAND-OUT #12-a

PIG PRODUCTION RECORD

Number of Pigs: Date of Purchase:

Beginning Weights: Breeding Source:

DATE	FEED	OBSERVATIONS

Total

Ending Weight:

SESSION TITLE: Introduction to Agriculture, General Program and Program Specific Sessions

SESSION #13 WEEK #1 DAY #3 (13-1-3)

PRESENTER:

CO-FACILITATOR:

TIME: 15:00-16:30 C

INTRODUCTION: SESSION OBJECTIVES

The Crossover (or other) job description is clarified, the technical objectives are linked to it and training activities are related to the objectives. Then, administrative procedures such as evaluation, feedback and decision-making are explained. To make sense of and participate in the decisions of technical training, the trainees need to understand the objectives and how they will be fulfilled. They should also have the administrative procedures of training made clear.

Objectives are:

- To demonstrate how the technical objectives relate to the (Crossover) job and why each is important;
- To explain how the performance objectives will be fulfilled and how each trainee will be evaluated according to them;
- To explain various procedures of technical training, such as feedback, plots, animals, Field Day;
- To encourage trainees to get involved in training decisions.

HAND-OUT: #13-a TAC sheets.

READING ASSIGNMENT: none

TECHNICAL VOCABULARY: none

Hand-out 13 a TAC Sheet

Peace Corps Assignment Area 199

Trainee Assignment Criteria ☐ Preliminary ☐ Final

1. Country/Training Class Name: THAILAND/Summer '84

2. Project Name and Assignment Title: TEFL Crossover/Community High School Teacher

3. Project Code: 493-B0

4. Training Date: 7/26/84

5. Trainees Requested: 10

6. Married Couples? ☐ Yes ☒ No (If yes, give numbers and restrictions in item 17.)

7. Pre-training Information: Camp X Med/Admin ____ Other ________ Dates: 7/19/84 To 7/23/84

8. Training Class I.D. ____________

9. Assignment No. ________

10. COI ________

11. Nominees

12. Specific _____ Generic _____ IP _____ UNV _____

13. NRD ________

14. Allocation: AT _____ NY _____ CH _____ DA _____ SF _____

15. Skill Codes (primary code first)

16. Placement Contacts/Code

17. Requirements/Restrictions (Education and Experience, list in order of preference; other skills, languages, marital restrictions)

You must have:

1. always been good in English, particularly writing and speaking; and

2. an interest in and strong willingness to teach English and assist in small scale agriculture projects.

3. a B.A./B.S. - Any discipline with an expressed interest in agriculture.

It would be helpful, but not necessary, to have a farm background or have been a future farmer of America.

18. Volunteer Assignment Description or Summary (Flexibility, commitment; project goals, objectives, duties, working/living conditions, training)

Being a Peace Corps Volunteer in Thailand is more than just a job. It is a unique opportunity for you to experience another culture and learn while contributing to international understanding and peace. To make the most of this opportunity, you need more than technical skills. You must also have the flexibility to adapt, an openness to learning, and most important, patience and a sense of humor.

It is impossible to overemphasize the importance of being able to establish rapport with your Thai co-workers and supervisors. Thais will not listen to you unless they like you. They will not like you unless you can communicate your skill with a sense of fun and have the ability to operate within a bureaucracy you cannot change. Although technical knowledge is important to your success, your supervisor will attach more importance to your attitudes and personal relations. There will be frustrations. Things move slowly in Thailand and the American work ethic will be noticeably absent in many of your Thai colleagues. If you feel that you can adjust to a society that will evaluate your performance primarily on the basis of your ability to culturally conform, read on. If, on the other hand, your own priorities require professional accomplishment and the attainment of specific goals as defined by American standards, PC/Thailand is not for you. Do not accept this job unless you genuinely want to contribute your time, skills and knowledge in accordance with the Thai work ethic and cultural practices.

If you do decide to accept, it should be with an awareness and understanding that education in Thailand is afflicted with many problems, especially the disparity between rural and urban educational opportunities. Such disparity is reflected in the poor quality of education in the rural areas due to a lack of qualified teachers and relevant curricula as well as the inadequacy of school facilities. Thailand has been trying to rectify this educational situation by modifying high school education to accommodate the needs of larger proportions of the young population to be able to make the most use of their local resources, improve upon local occupations and contribute to the development of their local communities.

As a Community High School Teacher, you will be assigned to a small and rural junior high school which offers two programs of study: 1/ an academic program, and 2/ a vocational program which consists of courses on the existing occupations in the community, e.g. farming, animal husbandry, small machine repair, electricity, food and clothing...etc. Your job assignment will be 1/ to teach English-as-a-Foreign-Language (TEFL) to 7th, 8th, and 9th Grade

ACTION Form 731A (Rev. 8/78 - All other editions are obsolete and will not be used.)

PEACE CORPS TRAINEE ASSIGNMENT CRITERIA
(Continuation Sheet)

Country/Training Class Name THAILAND/Summer '84	Project Title/Assignment Title TEFL Crossover/Community High School Teacher

students, about 12 hours per week; and 2/ to participate in the school's demonstration agriculture projects, i.e. vegetable plots, fruit trees, small animal husbandry, fish pond...etc. You will also assist in establishing and supervising students' home projects in the skill areas similar to the demonstration projects. You will be under the supervision of the school principal and will work closely with other staff members, especially the Heads of English and Ag. Departments. You will also be expected to participate fully in scheduled school activities. Besides your technical knowledge, among other factors, your ability to learn and speak Thai is even more essential to your success in this assignment. It will help facilitate communication between you and your students, co-workers, and a wide range of other people in academic and non-academic situations. You must be willing to extend yourself personally and professionally beyond the school assignment and enjoy being in a rural setting which has a very simple style of life. In short, being a volunteer is a 24 hours/day adventure in imaginative service and personal development. Teaching TEFL and working on Ag. projects during the school year (May 16 - October 10, and November 11 - March 31), working on a 5-week summer project of a similar nature to your assignment job, and being involved in your community will be a full-time project for you.

Your community will be a village of about 5,000 people. Housing, which you will share with Thai teachers, may be provided on campus. If campus housing is not available, you will rent a modest house in the village which you may share. Thai villagers are usually very friendly and hospitable, and teachers are always highly respected by them. They will invite you to stay in their homes, share their food with you, and make you feel like a member of the family. Flexibility in eating habits is important. Very strict vegetarians may find it difficult to maintain rigid diets and good social relations. However, maintaining a vegetarian diet in your own home will not be difficult. At times, it may seem as though they have an insatiable curiosity about every thing you do or say, and you may feel some frustration at the lack of privacy Westerners value so highly. Your ability to cope with these conditions will earn you respect and admiration, and will also give you an understanding and appreciation of a segment of Thai society seldom seen by outsiders. Although motorcycles are popularly used as a means of local transportation in Thailand, for safety reason, PC Thailand maintains a serious policy NOT TO ENCOURAGE you to own or use one. However, with careful evaluation on each circumstance, the PC Country Director may grant permission for you to use a motorcycle only if it deems necessary and that you agree to fully comply with all the provisions of the PC Thailand Motorcycle Policy.

Relations with the United States are close and, in spite of political changes and the unsettled border, life in Thailand goes on and volunteers are rarely affected by political events. 21 years of Peace Corps activities have left a legacy of receptive feelings. The high rate of extensions among PCVs attests to their general job satisfaction and cultural adjustment.

You will receive a pre-service training (PST) at several rural sites in Thailand. It will last for 14 weeks and will emphasize Thai language and culture since learning the language and understanding cultural practices are essential for successful job performance. Shortly after training begins you will move in and live with a Thai family in a village setting. This "home stay" will last for approximately 1 month and will help enhance your understanding of the language, culture and customs of rural Thailand. Another segment of the Training will be a technical orientation which will cover Tropical Agriculture and TEFL techniques. With the assistance of experienced PCVs during this period you will have an opportunity to learn more about the specifics of your job assignment so you can begin molding your skills and knowledge into the Thai context. Upon completing PST, you will be sworn in as a volunteer and your service will be for approximately 2 years from that time.

SESSION TITLE: Planting Pulses

SESSION #14 WEEK #1 DAY #4 (14-1-4)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

INTRODUCTION: SESSION OBJECTIVES

Pulses of many varieties are grown in the host-country and are an important part of the agricultural economy. Their importance as an export crop is secondary only to their value in a wide variety of manufactured products, which, in most cases, are consumed locally. Therefore, it is important that the trainees learn and understand:

- The different varieties grown in the host-country and the specific use of each.
- The time of year most suitable for production and the areas of the host-country where each variety is produced.
- The cultural practices of the majority of the farmers and ways of improving production, including insect control.
- Proper land preparation, water requirements, seed spacing, fertilizer use and proper use of insecticides for maximum yields.
- How and when to harvest and the residual effects in the soil for the following crop.
- How pulses fit well into intercropping programs and which crops are the most suitable for intercropping.

HAND-OUT: #14-a Planting Instructions for Pulses

READING ASSIGNMENT: Guide for Field Crops in The Tropics and Sub-tropics, pgs 138-144/179-186.

TECHNICAL VOCABULARY:

Hoe
Nodule
Rake
Mung bean seed
Inoculant
Manure
Fertilizer
Legume
Water can
Insecticide
Soybean seed

HAND-OUT #14-a

PLANTING INSTRUCTIONS FOR PULSES

1. Make bed 5 x 5 m with 7 furrows.

2. On each ridge open up the top about 3 inches deep, sprinkle 15-15-15 chemical fertilizer about 3 teaspoons/linear meter, with small pinch of Furadan evenly through the row, and mix with the soil.

3. Slightly cover the row within 2 cm of the top.

4. Put in 2 seeds every 10 cm spacing 2 cm deep. Use rake to cover the row, and firm the soil.

5. Spread manure .5 cu ft/sq m for soil conditioning and mulching purpose.

6. Water the plot after planting unless the soil has enough moisture.

SESSION TITLE: Cage and Pen Construction

SESSION #15 WEEK #1 DAY #4 (15-1-4)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 F

This is the third session on Cage and Pen Construction. (See Session #7-1-2 for details and Objectives.)

SESSION TITLE: Newcastle's Vaccine

SESSION #16 WEEK #1 DAY #4 (16-1-4)

PRESENTER:

CO-FACILITATOR:

TIME 11:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

Disease control is extremely important in the production of poultry; therefore, trainees should be aware of the following prior to implementing projects at their sites. They:

- Will become aware of the serious diseases that can affect poultry in the host country.
- Will review their understanding of the concept of vaccination.
- Will become familiar with the use of vaccines and the equipment necessary for administering each type.
- Will have hands-on experience in handling and treating chicks.

HAND-OUT: #16-a Chicken Vaccination Program.

READING ASSIGNMENT: Practical Poultry Raising Pgs 115-119.

TECHNICAL VOCABULARY:

Head
Mouth
Ear
Eye
Mix
Drop
Catch
Gently
Number
Practice

HAND-OUT #16-a

CHICKEN VACCINATION PROGRAM

This is a general vaccination program that should be effective for all host countries. However, it must be adapted to local disease patterns, climate and weather. Vaccines for four poultry diseases are manufactured by the Veterinary Department of the Ministry of Agriculture and Cooperatives in Thailand. These vaccines are available in all provinces and most ampoes. Vaccines manufactured by foreign companies can sometimes be found, but are not common. The following schedule makes use of the government vaccines only.

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AGE OF CHICKEN	VACCINE	METHOD OF VACCINATION
3 days	Newcastle's (Stan F) #1	Ocular
10 days	Fowl Pox	Wing-web
14 days	Newcastle's (Stan F) #2	Ocular

****

That should be enough for broilers, because they go under the knife at 40-45 days.

IMPORTANT!! If Newcastle's is epidemic near where you are vaccinating, you should do #1 when they're 1 day old and might follow up with a #3 at 28 days. Also, INFECTIOUS BRONCHITIS can be a problem in the cold months, especially in the mountains. Therefore, you should vaccinate your entire flock in November and all new chicks a few days after Newcastle's #1. If the weather is very cold, follow-up in January, and when chicks are 21 days old. Layers and native chickens last longer than broilers, so keep on vaccinating them, as follows.

****

60	Newcastle's (MP)	Wing-web
90	Cholera	2 cc. injection in breast
150	Newcastle's (MP)	
180	Fowl Pox	
270	Cholera (depending on weather--see below)	

****

That should get your chickens through the first year. For YEAR 2, do NEWCASTLE'S (MP) every 6-12 months depending on how prevalent it is. Don't forget BRONCHITIS in the cool season.

CHOLERA--This will make layers stop laying for a week. However, this disease can wipe out a flock in the hot season. Depending on the season you can give the first cholera vaccination anywhere from 2-5 months of age, but in late March or April to get them through the hot season. This vaccine is good for 6 months, but you may not need to follow-up until before the next hot season.

SESSION TITLE: Program Manager I

SESSION #17 WEEK #1 DAY #4 (17-1-4)

PRESENTER:

CO-FACILITATOR:

TIME: 15:30-16:30 C

INTRODUCTION: SESSION OBJECTIVES

The (Education)* Program Manager talks with trainees about Peace Corps in Thailand and the views of the Thai government. Trainees need to meet their future Program Managers.

Objectives are:

- For trainees and Program Managers to meet each other.
- To present a broad outline of successful PCV service in Thailand based on the history of that Program.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

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* This General Program Session is adaptable for any program. Program Specifc terms are shown in parentheses.

SESSION TITLE: Cage and Pen Construction

SESSION #18 WEEK #1 DAY #5 (18-1-5)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

This is the fourth and last two-hour session of Cage and Pen construction. (See Session 7-1-2 for details and objectives.)

SESSION TITLE: Laying Hens Arrive/Record Keeping

SESSION #19 WEEK #1 DAY #5 (19-1-5)

PRESENTER:

CO-FACILITATOR:

TIME 9:00-10:30 F/C

INTRODUCTION: SESSION OBJECTIVES

This session is designed to encourage trainees to keep accurate records and share the daily responsibility of taking care of animals. They:

- o Will learn how to care for laying chickens.
- o Will learn how to keep accurate records of production and inputs.
- o Will learn how to handle feed, water and nutrition.

HAND-OUTS: #19-a Egg Production Cage Record.
#19-b Egg Production Weekly Record.

READING ASSIGNMENT: Practical Poultry Raising, Pgs 21-29 and 65-79.

TECHNICAL VOCABULARY:

Layer
Cage
Water
Feed
Eggs
Cull

Comb

HAND-OUT #19-a

EGG PRODUCTION CAGE RECORD

CAGE # BEGINNING WEIGHT

EGG PRODUCTION

CAGE # BEGINNING WEIGHT

EGG PRODUCTION

CAGE # BEGINNING WEIGHT

EGG PRODUCTION

CAGE # BEGINNING WEIGHT

EGG PRODUCTION

CAGE # BEGINNING WEIGHT

EGG PRODUCTION

HAND-OUT #19-b

EGG PRODUCTION WEEKLY RECORD

Date	DAY	1	2	3	4	5	6	7
Eggs A.M.								
Noon								
Eggs P.M.								
Total								
Birds								
Feed								

Weekly Totals: Eggs _____ Birds_____ Feed _____

SESSION TITLE: Seed Germination Testing

SESSION #20 WEEK #1 DAY #5 (20-1-5)

PRESENTER:

CO-FACILITATOR:

TIME 10:30-12:00 C

INTRODUCTION: SESSION OBJECTIVES

The importance of seed germination testing becomes evident when seeds that are planted properly do not germinate and emerge. Therefore, in order to avoid lost time caused by replanting, the quality of the seed should be known prior to seeding. When the quality of the seed is a known factor, mistakes of over-planting (which causes excessive thinning) or under-planting (which causes poor strands) can be avoided. The objectives of this session are to inform the trainees of:

- The basic components of most seeds.
- The difference between a monocot and a dicot and how they differ in emergence.
- What conditions are required for germination to take place.
- Several methods of practical seed germination testing.
- The importance of seed germination testing.

HAND-OUTS: #20-a Seed Germination Test Instructions.
#20-b Seed Germination Results Form.

READING ASSIGNMENT: Vegetables, Pgs 1-8.

TECHNICAL VOCABULARY:

Seed
Germinate
Cotyledon
Water
Temperature
Paper
Plastic bag
Stick

Count
Put in
Roll up
Store away
Watch
Record

HAND-OUT #20-a

SEED GERMINATION TEST INSTRUCTIONS

There are many ways to calculate germination rate, some requiring expensive equipment. Here's a simple way.

1. Take a sampling of seeds from the can and clean out strange seeds (weeds and other vegetables), debris and incomplete seeds.
2. Count out 100 seeds.
3. Take two sheets of paper and on the top edge of one, write the kind of seed you're working with and some identification of the container it's coming from. Also, write today's date.
4. Moisten the labeled sheet of paper and lay it on the table, writing down. Sprinkle the 100 seeds evenly upon it, but don't leave any seeds close to the edges.
5. Lay the blank sheet of paper on the seeds with the writing up. Smooth it so that moisture soaks up into it, also.
6. Roll the paper around the stick so that the writing shows.
7. Put the roll in a plastic bag and put the bag in a dark, moist, warm place.
8. Daily unroll the paper and count the number of germinated seeds. Record your results below for 7 days. Also, note how the sprouts behave.

HAND-OUT #20-b

SEED GERMINATION RESULTS FORM

SEED TYPE:

VARIETY:

DATE TEST BEGUN:
OF SEEDS TESTED:

DATE	TIME	# GERMINATED	# ROTTED	OBSERVATIONS

SESSION TITLE: Composting Techniques

SESSION #21 WEEK #1 DAY #6 (21-1-6)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F/C

INTRODUCTION: SESSION OBJECTIVES

The lack of organic matter in soil is one of the most limiting factors to crop production in many host countries. In Thailand this problem is second only to available water for scheduled irrigation. Therefore, it is extremely important that trainees learn and understand not only the techniques for making compost but also the need and value of compost for host-country farmers. In this session trainees will develop:

- An understanding of the advantages of compost and manure over chemical fertilizers.
- Knowledge about what materials can be used in making compost by using different methods.
- An understanding of how compost is made, the length of time required and how to care for the compost pile to ensure quality.
- The knowledge of how compost can be used in conjunction with commercial fertilizer to cut costs of production and increase yields.

HAND-OUT:

READING ASSIGNMENT: Intensive Vegetable Gardening, pgs 44-53.

TECHNICAL VOCABULARY:

Compost
Hoe
Water can
Organic

Manure
Rake
Turning

Fertilizer
Basket
Decompose

SESSION TITLE: Using Organic Fertilizers

SESSION #22 WEEK #1 DAY #6 (22-1-6)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Organic matter content of the soil is the main factor that determines the quality of any soil and its productivity. Soils of the tropics are known to be low in organic matter. It is also difficult to maintain suitable organic matter levels in them. Therefore, it is important that farmers take advantage and use organic fertilizers for improved crop production. This session will teach the trainees the basics of:

- The values format in organic fertilizers.
- Where to locate supplies.
- The proper use of organic fertilizers to gain maximum benefits.
- The differences between organic and chemical fertilizers and how they can be used together.

HAND-OUT: #22-a Organic Manure Values.

READING ASSIGNMENT: - Intensive Vegetable Gardening, pgs 29-39.

- Soils, Crops and Fertilizer Use, pgs 31-34.

TECHNICAL VOCABULARY:

Manure
Compost
Comercial fertilizer
Green manure crops
Legumes

HAND-OUT #22-a

ORGANIC MANURE VALUES

TABLE 1: Shows the tremendous difference in yearly production of NPK per buffalo and cattle, by the two manure production methods (NPK in kg.)

Method	Yearly Quantity	Organic Matter	N	P_2O_5	K_2O
Buffalo rotten manure	10 cu m	1,400	45.0	37.0	56.0
Buffalo dry manure	2 cu m	286	8.8	5.6	7.4
Difference in kg per animal	8 cu m	1,114	36.2	31.4	48.6
Cattle rotten manure	5 cu m	700	22.5	18.5	28.0
Cattle dry manure	1 cu m	143	4.4	2.9	3.7
Difference in kg per animal	4 cu m	557	18.1	15.6	24.3

The quantity of NPK produced by one buffalo per year is the same as in 300 kg of 15-15-15 fertilizer and the value is more than Baht 1,500 without calculating the benefits of the organic matter.

The value of NPK production in quantitative terms that is shown in table 4 does not consider manure's qualitative value for soil improvement, reducing salinity and acidity and increasing water holding capacity. Furthermore we do not quantify herewith incremental yield due to application of large amounts of organic manure.

TABLE 2: Yearly manure production and its value (in terms of NPK) (in millions)

	cu.m.	Baht	U.S. $
Actual manure production	8.0	1,200	52
Additional production	32.0	4,800	208
Total	40.0	6,000	260

Table 3 compares the equivalent amount of 15-15-15 actual application per rai versus future adoption of the proposal.

TABLE 3: Equivalent Application of Chemical Fertilizer (15-15-15)
(Yearly production of 1 a.u.)

Amount of Manure cu.m.	Area (Rai)	Rotation in Year	15-15-15 Equivalent	
			Total Kg/Rai	Yearly Kg/Rai
2	3	3	20	6.6
10	3	3	100	33.3

TABLE 4: Application of Organic Matter
(Yearly production of 1 a.u.)

Amount of Manure	Area (Rai)	Rotation in Year	Kg. per Rai	Yearly Kg. per Rai
2	3	3	95	32
10	3	3	466	155

Any farmer with an average of 1 a.u. per 10 rai will be able to apply more than 3 cu. m of manure per rai to 3 rai every year and repeat the application every three years.

SESSION TITLE: Housing and Watering

SESSION #23 WEEK #1 DAY #6 (23-1-6)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:30 F/C

INTRODUCTION: SESSION OBJECTIVES

Housing and watering are the major components of successful animal management. In this session the trainees will learn:

- About the five components of animal raising and the developmental continuum from survival to high production levels under host-country conditions.
- To compare their own physical needs to those of livestock in tropical conditions and appreciate the extra importance of housing and adequate water.
- To identify and begin to deal with any problems that have developed in the livestock component of training.

HAND-OUTS: #23-a Livestock Production Levels

READING ASSIGNMENTS:

1. Small-scale Pig Raising, pgs 63-78.
2. Practical Poultry Raising, pgs 81-94.

TECHNICAL VOCABULARY:

HAND-OUT #23-a

LIVESTOCK PRODUCTION LEVELS

Volunteers will encounter a wide range of production levels for livestock with different farmers. These varying production levels will range from survival to moderate to high in regards to nutrition, management, housing, diseases and parasites, and genetics. The purpose of this handout is to begin to identify, for each of the 4 species, specific examples of the kind of conditions that comprise survival, moderate, or high level production environments. The examples given are meant to be "typical" of varying production levels. Every farmer's livestock operation will be different and these are meant only to be used as a general guide for the volunteer. It can also help the volunteer in determining when one of the five different categories of production is not on the same level with the others.

RABBIT PRODUCTION

SURVIVAL LEVEL

Nutrition:	Fed only table scraps and vegetable wastes. Given contaminated water on an erratic basis.
Management:	No improved practices at all. Given only the minimal care needed to keep the rabbits alive.
Housing:	Both bucks and does are placed on a dirt floor. There are no walls but there is a bamboo or palm thatch roof for shade.
Diseases/ Parasites:	Presence of two or more of the following: Coccidiosis, conjunctivitis, mange, ear mites, colds, or pneumonia.
Genetics:	Creole varieties present - no improved (exotic) breeds.

MODERATE LEVEL

Nutrition:	Given clean water daily. Given good quality grasses and legumes for forage daily.
Management:	Breeding records kept and ear tattooing practiced.
Housing:	Rabbits caged in bamboo or wooden hutches. Bucks and does separated. Cages cleaned occasionally. Rabbits shielded from drafts and the hot sun.
Diseases/ Parasites:	No pneumonia, mange, or coccidiosis present. Animals appear to be healthy and gaining weight. Coccidiostat used when needed.

Genetics: Presence of exotic or improved breeds - probably crossed with local breeds.

HIGH LEVEL

Nutrition: Vitamin and mineral supplement given ad lib. An adequate supply of fresh legumes and grain given daily. Fresh, clean water given twice daily.

Management: Meat production and breeding records kept. Ear tattooing. Fryers marketed at 8 weeks/4 pounds. Rabbits sexed, palpated, mated, and handled properly.

Housing: The cages have wire floors (1/2 grid), leak proof roof, kindling boxes, hay mangers, and automatic waterers. The cages are cleaned weekly. The rabbits receive morning sun and no drafts.

Diseases/ Parasites: Disease and parasite free. The regular use of a coccidiostat and dipterex or malathion for mange.

Genetics: All exotic breeds adapted to the local conditions and market preference in meat and size.

POULTRY PRODUCTION

SURVIVAL LEVEL

Nutrition: Scroungers, feed off of weed seeds, insects, manure, and table scraps. Probably drink contaminated water.

Management: No improved management practices used.

Housing: Free range - no housing provided. Perch in trees at night. Losses to predators.

Diseases/ Parasites: Problems with both internal and external parasites. High mortality losses. Presence of both morbidity and mortality diseases such as Fowl Pox, Newcastle, Coryza, and Coccidiosis.

Genetics: All local varieties - no exotics.

MODERATE LEVEL

Nutrition: Fed "scratch" feeds (low quality and percentage protein grains), table scraps, and starchy tubers. Given water daily

Management: Wings clipped, coccidiostat used occasionally (during outbreak), home-made feeders and waterers used. Eggs collected daily.

Housing: Penned on a dirt floor with thatch roof and fenced walls of thorn, thatch, or wood.

Diseases/ Parasites: No current outbreaks of mortality diseases though birds may be carriers. Possible coccidiosis or overall stress lowering production.

Genetics: Mixture of local breeds and exotics. Generally, "dual purpose" birds for both meat and eggs.

HIGH LEVEL

Nutrition: Ad-lib fed a complete, balanced ration adapted to the type of production (egg laying or eating birds) and the cost of feeds locally. Includes a source of animal protein in the ration. Good supply of calcium. Fresh, clean water given daily.

Management: Light source used for layers, brooders used for chicks. Kept separate from other birds. Breeding stock from good hatchery. Eggs collected daily. Birds debeaked and production records kept daily.

Housing: Regular chicken coops using chicken wire and good roof. Perches and nesting boxes provided. No drafts, proper spacing requirements met. Automatic waterers and feeders used.

Diseases/ Parasites: Disease vaccination schedule maintained for all major poultry diseases in the area. Birds are disease and parasite free. No known carriers in flock.

Genetics: All exotic breeds. Probably leghorn used for egg production. Heavier meat breeds used for broilers.

SWINE PRODUCTION

SURVIVAL LEVEL

Nutrition: Free range, scroungers. Diet consists of whatever is found in the streets - roots, feces, grass, and weeds. May be fed table scraps occasionally. Drinking water is probably contaminated by parasites.

Management: Probably no improved management techniques are used. In Latin America a forked yoke is commonly used to keep the pig out of barbed wire fences.

Housing: Free ranging during the day but may be placed in a compound at night.

Diseases/ Parasites: Roundworm, tapeworm, fleas, and ticks are common. Probably are carriers of diseases such as brucellosis, hog cholera, African swine fever, and others. High mortality losses.

Genetics: No exotic breeds - all locally adapted breeds. Street pigs.

MODERATE LEVEL

Nutrition: Fed starchy tubers such as cassava, taro, yams, or potatoes, table scraps, and occasionally small amounts of corn or other low protein grains. Watered daily.

Management: Given deworming medicine occasionally, boars castrated, and sows still unassisted at farrowings. Ear may be notched or some marking present to indicate ownership.

Housing: Hog is penned and has a mud "wallow" to use for cooling down during the heat of the day. Possible shade from trees, and a dirt floor. Both sexes are still housed together.

Diseases/ Parasites: No current outbreaks of the major mortality diseases. Some morbidity diseases, internal and external parasites still present, producing stress on the animal and lowering feed conversion and weight gain. May or may not be carriers of disease.

Genetics: Mixture of local varieties and improved breeding stock. No control over breeding.

HIGH LEVEL

Nutrition: Fed a high production feed ration that meets the NRC requirements for ME, CP, Lysine, Calcium, and Phosphorus. Clean, fresh water and feed available ad-lib.

Management: Production and breeding records kept. Farrowing crate used during farrowing, sow assisted during farrowing, piglet cords dipped with iodine, iron shots given, and needle teeth clipped. Boars are castrated and all pigs dewormed on a regular schedule.

Housing: They are penned on a cement floor. Farrowing crates, dirt runways, and pastures are used. Automatic waterers and feeders are used and they are kept dry by a good roof.

Diseases/ Parasites: Disease and parasite free stock. A regular vaccination schedule is followed.

Genetics: All exotic breeding stock used to obtain a 3 way cross in meat hogs for hybrid vigor.

GOAT PRODUCTION

SURVIVAL LEVEL

Nutrition: Goats fed on overgrazed, unfertilized grass pasture of poor nutritional value. Given no protein, vitamin, or mineral supplements. Water may be in short supply and is probably contaminated with parasites.

Management: No improved management practices. Goats used for meat only - not milk.

Housing: Days spent foraging on pasture - may or may not be placed in the compound at night.

Diseases/ Parasites: Brucellosis, mastitis, or mile fever may be present. Probable infestation of roundworms, coccidiosis, lice, and/or mange.

Genetics: All local breeds adapted to poor feeds - non milkers.

MODERATE LEVEL

Nutrition: Fed on pastures of improved varieties that are rotated regularly and not overgrazed. Occasionally grazed on legume crops. Adequate water supply but may be contaminated with parasites.

Management: Goats are milked daily. Does with severe mastitis or brucellosis are treated or culled. Treated for both internal and external parasites , but not regularly.

Housing: Animals are rotated on different pastures during the day and kept in the compound at night to prevent predator losses.

Diseases/ Parasites: Herd may still be carriers of disease even though there are no current outbreaks. Parasites a problem still - but not severe due to an occasional treatment.

Genetics: Mixture of local breeds and exotic stock. Dual purpose animals for both meat & milk.

HIGH LEVEL

Nutrition: Goats are fed high quality legumes and grazed on improved and fertilized pastures. Grains and a vitamin and mineral supplement fed to the milking does. Ad-lib fresh and pure water.

Management: Dehorning, castration, and hoof trimming are practiced. Milking stalls used and does milked twice daily. A regular vaccination schedule is followed for all major diseases in the area. Production and breeding records are kept.

Housing: Bucks and kids are grazed during the day and penned at night. Does remain penned all the time and feed brought to them. Barn has a dirt floor and a roof for shade. The barn contains individual stalls with bedding and individual stanchions for milking.

Diseases/ Parasites: Disease and parasite free herd. Treated when necessary for mastitis and roundworms. All new stock is kept separated from herd until it is sure that they are disease free.

Genetics: Improved, exotic stock such as Nubians or Toggenburgs.

SESSION TITLE: Record Keeping (Crops)

SESSION #24 WEEK #1 DAY #6 (24-1-6)

PRESENTER:

CO-FACILITATOR:

TIME: 11:30-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Record-keeping is as important as any function related to crop production. This exercise will not only show what one spends to produce a crop/crops but will in turn show the returns. These, when used together will show profit or loss. This session will show the trainees.

- o The techniques of accurate record keeping.
- o The importance of keeping records.
- o Which items or functions are the most important.

HAND-OUT: #24-a Sample Record Form.

READING ASSIGNMENT: Intensive Vegetable Gardening, pgs 60-67.

TECHNICAL VOCABULARY:

HAND-OUT #24-a

SAMPLE RECORD FORM

NOTE THE FOLLOWING:

- Seed cost
- Fertilizer cost
- Planting dates.
- Rainfall.
- Irrigations.
- Fertilizer inputs.
- Fertilizer application dates.
- Insect control dates.
- Insecticide use record.
- Harvest amounts and dates.
- Sales, amount and type.
- Profit and/or loss.

Plot Record: Owner:

Date	Work	Observations

Week #2

25	2	7	Planting Cassava and Sweet Potatoes	06:00-08:00	F
26	2	7	Nursery and Transplants	09:00-11:00	F/C
-	-	-	Dev	11:00-12:00	-
-	-	-	L/CC	13:30-15:00	-
27	2	7	Agricultural Environment	15:00-16:30	C
28	2	8	Planting Transplant Plots	06:00-08:00	F
29	2	8	Feed and Nutrition	09:00-11:00	F/C
30	2	8	Units of Measure/ Introduction to Metric II	11:00-12:00	F/C
-	-	-	L/CC/Dev	13:30-16:30	-
31	2	9	Poultry Feeds and Nutrition	06:00-08:00	C
32	2	9	Plant Water Requirements	09:00-10:00	F
33	2	9	Maintenance and Weeding	10:00-12:00	F/C
34	2	9	LSS Project and XOVER Roles	13:30-15:00	C
-	-	-	L/CC/Dev	15:00-16:30	-
35	2	10	Traditional Rice Production Techniques	08:00-10:00	F/C
36	2	10	Introduction to Tropical Crop Management	10:00-11:30	C
-	-	-	L/CC	13:30-15:30	-
37	2	10	Quiz I	15:30-16:30	C
38	2	11	Field Trip: Fish	08:00-12:00	F
39	2	11	Training Evaluation I	15:00-16:30	C
40	2	12	Fowl Pox Vaccine	08:00-09:30	F
41	2	12	Vegetable Characteristics	09:30-11:00	C
42	2	12	Seed Germination Results	11:00-12:00	C

SESSION TITLE: Planting Cassava and Sweet Potatoes

SESSION #25 WEEK #2 DAY #7 (25-2-7)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

INTRODUCTION: SESSION OBJECTIVES

Due to cassava's being an important crop to the host-country economy and the value of sweet potatoes for home consumption, it is important that the trainees learn the production basics for these crops. Therefore, during this session the trainees will develop the skills necessary:

- To prepare proper beds and ridges for planting.
- To be able to select and prepare cassava stem cuttings, sweet potato vine cuttings and sweet potato transplants.
- To understand the basic fertilizer and water requirements for normal production in the areas where these crops are produced.
- To determine the most suitable time for harvest and the most appropriate harvesting techniques of the host-country.

HAND-OUTS: #25-a Planting Instructions for Cassava.
#25-b Planting Instructions for Sweet Potatoes.

READING ASSIGNMENT: Guide for Field Crops in The Tropics and Sub-Tropics, Pgs 231-235/241-246.

TECHNICAL VOCABULARY:

Hoe
Rake
Knife
Cassava stem cuttings
Sweet potato vine cuttings/plants
Compost
Water can
Manure
Peanut seed

HAND-OUT #25-a

LAND PREPARATION AND PLANTING INSTRUCTIONS FOR CASSAVA

1. Clear the 5 m x 5 m plot of all weeds and grass.

2. Using the hoe, till the soil to a depth of 6 to 8" (15-20 cm), at the same time filling in low areas and leveling the entire plot.

3. Build ridges with deep furrows about 12-18" (30-45 cm) high. Place ridges 1 m apart, evenly spaced within the 5 x 5 m plot.

4. Manure may be applied by broadcasting during tillage or as a mulch for moisture retention. The amount recommended would depend entirely on the available supply with recommendations of not less than 1 cu ft per sq m.

5. The application of commercial fertilizers is not recommended, as under normal conditions it is not economical to apply due to the weak market for cassava.

6. Cuttings for planting cassava should be 8" (20 cm) long and taken from the center sections of the previous crop's stalks. Care should be taken that no diseased portions of the stalks are used.

7. Place the cuttings on the ridges at 50 cm intervals with 50% or 4" (10 cm) of the cutting covered with firm soil. Care should be taken that the bottom node is well covered with soil.

8. Inter-cropping with legumes is a common practice, with peanuts and mung beans the most widely used. Inter-cropping is only practical when sufficient moisture is available, and will assist in controlling grass and weeds.

9. Water by furrow until the area is thoroughly moist and maintain this moisture until the cuttings have rooted and top growth appears. Adequate moisture during the growing period of about 12 months will improve yield and quality.

HAND-OUT #25-b

LAND PREPARATION AND PLANTING INSTRUCTIONS FOR SWEET POTATOES

1. Clear the 5 m x 5 m plot of all weeds, grass and other debris.

2. Using the hoe, till the soil to a depth of 6" to 8" (15-20 cm). At the same time fill in low areas and level the entire plot.

3. Build ridges and furrows 12" to 18" (30 to 45 cm) high, with 1 m between rows. This will give you 5 ridges evenly distributed in your 5 m plot.

4. Manure may be applied by broadcasting prior to tilling and/or as a mulch for moisture retention after the cuttings have been planted. The quantity used would depend on the supply, with 1 cu ft per sq m recommended as the minimum in order to receive noticeable results.

5. Fertilizer 15-15-15 at the rate of 50 kg/rai (32 gms/sq m) broadcast prior to tilling, or as a side dressing in the beds, with the latter being recommended.

6. Place the cuttings on the ridges at 50 cm intervals. Remove the leaves from the bottom half of the plant and insert into the soil at about a 45 degree angle.

7. Water by furrow until the area is thoroughly moist and maintain this moisture until the cuttings have recovered and rooted well. Adequate moisture throughout the growing period will greatly improve yield and quality.

SESSION TITLE: Nursery and Transplants

SESSION: #26 WEEK #2 DAY #7 (26-2-7)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 F/C

INTRODUCTION: SESSION OBJECTIVES

All types of vegetables are grown from seed but many do poorly when direct-seeded to field plots. Therefore, there are many advantages for growing seedlings in the nursery until ready for transplanting. This session will give the trainees hands-on experience concerning:

- Which vegetables must be transplanted and which ones do better when transplanted.
- How to prepare the nursery seed bed.
- How to seed for growing successful transplants--i.e. broadcast- or row-seeding.
- How to take care of seedlings after they emerge--watering and shading.
- When to transplant seedlings to individual plastic bags and when to move them to plots.
- How to plant without severe set-backs to plants.

HAND-OUT: #26-a How to grow super transplants.

READING ASSIGNMENTS: Intensive Vegetable Gardening, Pgs 108-112.

TECHNICAL VOCABULARY:

Nursery
Nursery bed
Seeding
Mixture
Seedling transplant

Broadcast
Row seeding
Seed
Basket

HAND-OUT #26-a
HOW TO GROW SUPER TRANSPLANTS

Growing healthy, vigorous transplants is the old science-and-an-art trip. Without good management, you'll end up with entrees for an ag gong show.

THREE WAYS TO START THEM: Nursery Seedbed, Seedbox, Individual Containers.

1. In-the-Ground Nursery Seedbed Method: The plants are grown out-doors on raised seedbeds made from ordinary soil or preferably a specially prepared soil mix (see next page). Seeds are planted in rows 2-3" apart and then transplanted to the field 3-6 weeks later. In the rainy season, a removable thatch roof or permanent clear plastic roof should be built over the seedbed to prevent damage from heavy rain. Partial shade may be necessary if heat and sunlight are intense.

2. Seedbox Method: A good seedbox can be made from 1/2" wood and should be 3-4" deep and an easy to handle size (no bigger than 16 x 24" or so) with drainage holes in the bottom. A soil-compost, rice hull-soil, or other loose and well-drained mix is used. The seedbox is kept in full or partial sunlight either outdoors with a removable or clear plastic roof or else in a greenhouse; it should be raised up on blocks or stilts to cut animal and ant damage. Seedboxes offer more controlled, protected conditions than nursery seedbeds and are recommended when only a few hundred transplants are needed. About 400 transplants can be grown per sq meter of seedbox space.

   The plants can remain in the seedbox until full transplant size if properly spaced and progressively thinned to give at least a 2" x 2" final spacing. Some growers prefer starting out seeds in shallow flats a couple of inches deep and then transplanting to a deeper seedbox or nursery seedbed when the seedlings have formed their first pair of "seed" leaves. The only real advantage of this double transplant method is that most of the seedlings can be used instead of throwing the thinnings away. There's no evidence that transplanting stimulates a better root system.

3. Individual Container Method: Seedlings are raised in individual peat, plastic, or paper (homemade) pots. A special potting mix like vermiculite or peatlite can be used or you can easily make your own (see next page). Two or three seeds are planted per pot and thinned to one plant at the first true leaf stage. Big advantage of containers is that root injury is minimized during transplanting.

Whatever method you choose, remember that care and management are more important than the actual method.

HAND-OUT #26-a (CONTINUED)

SOIL MIXES FOR TRANSPLANTING:

Straight soil seldom makes a good planting medium compared to a mix. It's either to clayey (makes it tight and poorly drained) or too sandy (low water holding ability). When confined in a shallow pot or seedbox, most natural soil tends to become very poorly drained near the bottom no matter how many drainage holes you make--there's no soil below to provide a suction force to draw the water away, and gravity by itself isn't strong enough. That's the main reason you should use an extra coarse soil mix which will facilitate drainage yet still hold an adequate amount of moisture. Soil mixes also are usually lighter than regular soil, making it easier to move seedboxes around.

Here are a few recipes for soil mixes (variations are endless):

1. 1:1:1 sand-soil-compost. Modify the ratio to suit the soil you're using. Well rotted manure can be used.

2. A 2:1 or 1:1 rice hulls-soil mix.

3. A 1:3 sand-compost mix. Rotted coconut husk fibers run through a 1/4" mesh screen make great compost.

FERTILIZING:

Don't rely on compost alone to supply the needed nutrients; it's a low analysis, slow release source. Compost that's only partly rotted is not adequate.

Too much or unbalanced fertilizing produces overly succulent and leggy plants (makes them especially prone to damping-off disease.) Use an NKP fertilizer with a high P ratio (like 12-24-12 or 10-30-10). Aim for an application equal to 80-100 lbs (kgs) N, 150-250 lbs (kgs) P_2O_5, and 100-200 lbs (kgs) K_2O per acre (hectare). That's equal to 80 grams per sq meter of 12-24-12 or 10-30-10 or about 5 level tablespoons (about 1/2 table spoon per sq foot).

How to Apply Fertilizer: Mix it in thoroughly with the seedbox soil mix or broadcast and work it into the top 4" of the nursery seedbed.

Nitrogen Deficiency: May show up after a few weeks due to the extra high leaching losses occurring in shallow containers. Leaves start turning a pale yellow. Water the seedlings with 1 tablespoon ammonium sulfate (or 1-1/2 teaspoons urea) dissolved in 1 gal. of water. Once should do it. Wash off leaves with plain water afterwards.

Timing Transplant Production

If tomatoes are to follow a crop of beets, the preparation and planting of the tomato nursery seedbed should be timed so that the transplant will be ready for field setting as soon as the beets are harvested.

Staggering Plantings of a Crop

A common problem for most garden projects is that each crop's production flow tends to be very uneven. This "feast or famine" syndrome can be largely overcome by making a series of staggered plantings of the crop at weekly to monthly intervals rather than one planting alone. Another means is to plant early, medium, and late maturing varieties of a crop simultaneously to extend the harvest period.

Aside from evening out the flow of produce of home consumption, staggered plantings have several important advantages for market gardens:

a. Buyers are usually partial to producers who can provide a reliable supply of produce over a long period.

b. By spreading out the marketing period for a vegetable, growers can usually take advantage of favorable market price fluctuations, rather than gambling on a good price for a single marketing. Also, there is less likelihood of glutting the market and causing drastic price declines.

In selecting an appropriate time interval between staggered plantings, it's important to consider the harvest duration of each planting. Some suggestions:

a. A planting of sweet corn will remain at a harvestable stage for only 7-10 days; thus, succession plantings would be needed at 7-10 day intervals for an even flow of produce. Another approach would be to plant an early (about 65 days to maturity), medium (80 days), and late (90 days) variety at the same time which would provide a harvesting period of about a month.

b. The harvest duration of tomatoes varies greatly with the type. The short, bushy, determinate varieties have a harvest duration of only 2-3 weeks, while the tall growing, indeterminate varieties can continue producing for several months if the plants aren't killed off by fungal leaf spot diseases.

c. Some vegetables such as Swiss chard, spinach, leaf lettuce, mustard, and collards can be harvested either all at once (i.e. pulling out or cutting off the entire plant) or they can be picked a few leaves at a time over a number of weeks (new leaves continue to be produced from the base).

SESSION TITLE: Agricultural Environment

SESSION #27 WEEK #2 DAY #7 (27-2-7)

PRESENTER:

CO-FACILITATOR:

TIME: 15:00-16:30 C

INTRODUCTION: SESSION OBJECTIVES

The relationship between agriculture and its environment is complex. The human activity of agriculture cannot help but affect its environment, nor can agriculturists ignore the effects environmental factors have on agriculture. Only by understanding these effects, can farmers and PCVs maximize the benefits and minimize the side-effects of their work. (Here, environment is broadly taken to include social, economic and political factors, in addition to natural factors.) Trainees will learn in this session how:

- Agriculture affects the environment.
- They can control or reverse these effects.
- To understand the major influences on work and lifestyles of farmers and their families.
- It is possible to gather information on these influences.

HAND-OUT: #27-a The Agricultural Environment.

READING ASSIGNMENT:

- Guidelines for Field Crops in the Tropics and Sub-Tropics. Pgs 1-28.
- Traditional Field Crops, pgs 1-33.

TECHNICAL VOCABULARY:

Season	Hot season
Rainy season	Cold season
Sunlight	Environment
Marketing	Credit

HAND-OUT #27-a

THE AGRICULTURAL ENVIRONMENT

The local agricultural environment is made up of those factors which influence an area's agriculture. Some of the factors that are important in the host-country are listed below. We'll discuss the most important. Always keep in mind that these factors are closely interrelated.

NATURAL (PHYSICAL) ENVIRONMENT

Climate

Weather

Ecology (the interaction among crops, weeds, diseases, insects, animals and people)

Water Resources (natural)

Land

Soils

INFRASTRUCTURE & SOCIAL ENVIRON.

Transportation

Communications

Marketing

Storage and Drying

Land Improvements

Water Resources (man made)

Local Farming Practices

Available New Technology and Systems

Ag. Supplies, Equipment

Credit

Advisory Services

Ag. Labor Force

Land Distribution & Tenure

CLIMATE:

Some crops only do well in the cool uplands of the north, while others can survive the long hot, dry periods in the northeast. The consistent climate of some parts of the south allow some crops to thrive year round. When and what crops are grown have a large part in determining rural life styles.

SEASONS:

For most of the host-country, the distinct seasons dictate what crops can be planted and when. The major factors are rain, temperature and photo period.

RAINFALL

In dryland (non-irrigated) areas, rainfall is the major environmental factor determining which crops can be grown, when they're planted and harvested, and what they yield. Rainfall varies greatly from place to place, often within surprisingly short distances, especially under mountains or hilly terrain.

Keep in mind that:

1. Annual rainfall averages have little meaning: seasonal distribution and reliability are far more important in terms of crop production.

2. Seasonal rainfall distribution gives a good indication of the amount of moisture available for crop production, but it doesn't give the full story. The amount of rainfall that is actually stored in the soil for crop use depends on other factors, too, such as water run-off and evaporation, and the soil's texture and depth.

3. Don't be too concerned by what is "normal". You must be able to deal with what might happen, to be successful. Expect deviations and know how you'll respond.

4. Cropping cycles are closely related to rainfall patterns: After the soil is baked in the hot season, a certain amount of rain must soften it up for plowing. Rice likes a lot of rain. Corn a lot, but not too much. Legumes do poorly if it rains much after they flower.

5. The farmer is a weather "expert": She/he knows the local conditions because his/her livelihood depends on it.

6. You must work the above cycles & rainfall data around your school's calendar. When school closes, there won't be anyone to watch crops. This may force you to plant at less than perfect times.

SUNLIGHT:

Generally the inverse of rainfall. Rain and the clouds it falls from prevent sunlight from reaching crops. Also, the short day lengths of winter lessen the sunlight available to chlorophyll. Yet, some crops (cabbage family) prefer less sunlight. In the north and northeast, day lengths are about 12 hours in December and 14 hours in June.

LAND:

Although you'll see it here, field crops should not be planted on slopes greater than 6% unless terracing is used. Hilly land is best suited for livestock grazing (not heavy) and tree crops. Also, lowland that floods in the rainy season is generally unusable at that time of year.

SOILS:

Different soils favor different crops. Work with nature and adapt to each situation.

WATER RESOURCES:

Even when your land borders a river, you must do something to get the water to your plant roots. A hand dug well is fine for vegetables,but useless for flooding rice. The amount of water that your irrigation system can deliver limits the crops you can grow in the dry & hot seasons. It takes more water for rice and vegetables, than for peanuts and mangoes.

MARKETING:

This isn't important for subsistence crops, but means everything for cash crops (which includes the surplus from subsistence crops). Setting production records won't pay taxes if you can't get a decent price for your crop. Markets also affect how much you should invest in fertilizers and other inputs. Don't plant until you've found a market.

In the host-country, most things are sold through middlemen. Unless you're working on a small enough scale to sell to friends and acquaintances, get to know the middlemen. Know the going prices and how they vary according to season and supply. The price of garlic is around 50-70 baht/kg in September, but only 10-15 baht/kg in April. Obviously, if you can grow garlic when the price is good you can make a good profit. If you grow when it's easy to grow, you'll have a lot of company and the price will be low.

HABIT AND CUSTOM:

Much sophisticated agricultural knowledge resides in the universities and other government agencies. However, many farmers learn, not from the "educated", but from their parents, siblings, relatives and other villagers. In this way, they use a proven method - they can depend on their cultural practices to put food on the table. This isn't true of the "new" ideas coming from agricultural extension agents. However, farmers will copy a practice that another farmer uses successfully.

CREDIT:

Credit is increasingly important as more costly technology is spread throughout the host-country. However, many farmers aren't used to saving money and most borrow to buy fertilizers, tractors and chemicals. Many are poor risks and can't get credit from banks, which forces them to borrow from merchants and money lenders at high to serious interest rates. The problem snowballs from there.

LAND DISTRIBUTION AND TENURE:

There used to be enough land for everyone, but now the host-country is getting crowded. Many farmers have lost their land to merchants and must rent or work in the hills. Land is usually rented for a crop cycle, not long term, and there is no incentive for a farmer to improve land he doesn't own.

SESSION TITLE: Planting Transplant Plots

SESSION #28 WEEK #2 DAY #8 (28-2-8)

PRESENTER:

CO-FACILITATOR:

TIME: 6:00-8:00 F

INTRODUCTION: SESSION OBJECTIVES

Transplanting of many varieties of vegetables is very important for several reasons;, therefore, this session should be well prepared in advance with several types of transplants started 2-3 weeks prior to session presentation. This session will give the trainees the knowledge and experience necessary to:

- Assist them in preparing a proper seed bed suitable for transplanting.
- Know which plants are most suitable for transplanting in the host country.
- Understand when transplants of all kinds are ready for transplanting, and how to prepare them for transplanting.
- Know how to care for the transplants to speed recovery and prevent losses.

HAND-OUT: #28-a Transplanting Bed

READING ASSIGNMENT: Intensive Vegetable Gardening, Pgs 108-112.

TECHNICAL VOCABULARY:

Transplants
Digging fork
Shovel
Hoe
Rake
Basket

Fertilizer
Manure
Water cans
Vegetable names
Flower names

HAND-OUT #28-a

TRANSPLANT BED 1 x 5 M

1 m

1 m	Plant Spacing 30 x 50 cm	Tomatoes
1 m	Plant Spacing 30 x 50 cm	Eggplant
1 m	Plant Spacing 25 x 50 cm	Chili Peppers
1 m	Plant Spacing 20 x 20 cm	Flowers
1 m	Plant Spacing 15 x 25 cm	Kale

SESSION TITLE: Feeds and Nutrition

SESSION #29 WEEK #2 DAY #8 (29-2-8)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 C

INTRODUCTION: SESSION OBJECTIVES

Proper animal nutrition is one of the main components in animal health and profitable livestock production. In this session trainees will use their understanding of human nutrition and the discussion of their reading assignment to:

- o Develop an understanding of animal nutritional needs.
- o Identify the different types of feedstuffs.
- o Understand the concept of balancing a ration.

HAND-OUT: #29-a Introduction to Animal Nutrition.

READING ASSIGNMENT: Introduction to Animal Nutrition (Hand-out).

HAND-OUT #29-a

INTRODUCTION TO ANIMAL NUTRITION

The basic concepts defined and discussed in this section of the livestock guidelines are also applicable to human nutrition. In the spirit of training integration it is a hope that these guidelines help the trainees develop a deeper understanding of their own nutritional needs by learning about those of animals. Furthermore, many of these concepts can be applied to those people they will be working with in-country. Many of the ideas and concepts covered in this section relate to the topics of health and nutrition in core classes and nutrition in the crops/vegetable training.

Nutrition is the process of changing food to living tissues and maintaining it. Nutrients are substances that:

1. Build and repair body tissue.
2. Provide energy.
3. Regulate body processes.

The amount of these needed in the body depends on:

1. The species of the animal i.e. simple stomach vs ruminants.
2. Purpose of the animal:
    a. Egg, meat, milk, or wool production
    b. Lactation/reproduction
    c. Growth
    d. Maintenance

Many microorganisms have simple nutrient requirements. They are:

a. Inorganic elements
b. Water
c. Source of nitrogen
d. Source of energy

All these can provide growth and production. Higher animals, including man, require more complex nutrient needs. Simple stomach or monogastric animals (man, chickens, and pigs) unlike ruminant animals (cows, sheep, and goats) require more complete proteins and vitamins in their diet because they cannot produce protein that includes all of the essential amino acids with just a supply of nitrogen.

Nutrients can be divided into six categories. These are water, carbohydrates, fats, proteins, vitamins, and minerals.

I. WATER

Water is the cheapest and most abundant nutrient. Consider the following:

1. 65 to 70% of the body weight at birth is water.
2. 40 to 50% of body weight of an animal at marketing is water.
3. 90 to 95% of the blood is water.

Sources of water to the animal include:

1. Drinking;
2. Food;
3. Metabolism (break down of nutrients).

If water is not available or withheld from an animal, the animal compensates in order to produce enough water to maintain its body's normal functioning. First, urine excretion and water in the feces are reduced. Second, the animal metabolizes the tissues present to provide metabolic water, causing weight loss. Third, the animal attempts to keep cool, seeking shade so as to reduce water loss from evaporation and sweating. Fourth, there is a reduction in feed consumption unless the feed is high in moisture. In low production or survival environments, the animals have probably developed these compensatory mechanisms as a means of survival. Since their owners do not usually provide water, the animals probably have developed a resistance to drought stresses and through time have become hardier animals.

Factors which affect the water requirement:

1. The type of diet, i.e., green forage vs dry forage.
2. The purpose of the animal, i.e., lactation vs meat.
3. The type of digestive tract, i.e., ruminant vs nonruminant.
4. The type of urinary system, i.e., mammals vs birds.

Function of water in the animal:

1. Transport of nutrients.
2. Chemical reactions.
3. Temperature regulation.
4. Maintains shape of the body cells.
5. Lubricates and cushions the body.

Approximate water consumption (mature animal):

1. Swine 1 1/2 to 3 gallons/head/day.
2. Sheep 1 to 3 gallons/head/day.
3. Poultry 2 parts water for each part of dry feed.

II. CARBOHYDRATES (CHO) ENERGY NUTRIENT

1. These are made up of carbon, hydrogen, and oxygen with chemical similarity of H_2O.
2. These include sugars, starches, and cellulose.
3. Very little occurs as such in the animal's body.
4. CHO makes up 3/4 of plant dry weight.
5. It forms the largest part of an animal's food supply.
6. These are formed by photosynthesis in plants.

Classification (by number of sugar molecules)

1. Monosaccharides (simple sugars)

   a. Glucose
   b. Fructose
   c. Galactose

2. Disaccharides

   a. Sucrose
   b. Malatose
   c. Lactose

3. Polysaccharides

   a. Starch. Stored in small amounts in the body in the form of glycogen in the liver.
   b. Cellulose. All walls of plant cells are composed of cellulose.

Digestibility:

Crude fiber (cellulose, hemicellulose, & lignin) poorly digested CHO. Nitrogen Free Extract (soluble sugars and starches) readily digested. Function:

1. Energy;
2. Heat;
3. Building stones for other nutrients;
4. Stored in animal's body by converting into fats.

III. FATS - LIPIDS (EITHER EXTRACT)

1. Made up of CHO.

2. Produces approximately 2.25 times more energy than CHO or proteins, and more per unit of weight.

3. Composition: Fat = Glycerol and 3 fatty acids.

4. Fatty acids are either saturated or unsaturated.

5. Fatty acids considered essential for animals:
   a. Oleic
   b. Linoleic
   c. Linolenic
   d. Arachidonic

6. Fats are located in the animal body just below the skin surrounding the internal organs, in the milk, and marbling. In plants, fats are found in the seed germ or embryo.

7. Function:

   a. Energy
   b. Heat and insulation
   c. Protection
   d. Aid in absorption of fat soluble vitamins
   e. Marbling

Measuring the energy value:

Although all nutrients are equally important, feedstuffs are usually evaluated on the energy value because:

1. Energy is required in larger amounts than other nutrients.

2. It is the most limiting factor in livestock production and the major cost.

3. When all the other nutrients are present in adequate amounts, the amount of feed consumed is determined primarily by the energy level of the ration.

Energy is usually measured in kilocalories (Kcal). A Kcal is the amount of energy as heat required to raise the temperature of 1 kilogram of water one degree Centigrade. Another system of measuring energy is the Total Digestible Nutrient system (TDN).

This system is usually used in determining the energy requirements of ruminants and rabbits. TDN is the sum of the digestible protein, fiber, nitrogen free extract (CHO) and fat times 2.25. It is expressed either as a percentage of a ration or in pounds or kilograms.

The following scheme explains the utilization of energy by the animal:

Gross Energy

Digestible energy
(Similar to TDN)

Fecal Energy

Metabolizable
Energy

Urinary Energy/
Combustible Gas

Heat Increment

Net Energy

Maintenance

Production

Gross Energy is the total potential energy of the feedstuff.

Fecal Energy is energy lost in the form of undigested food residue and energy-yielding metabolic products.

Digestible Energy is GE - FE, Energy received by digestion - similar to TDN.

Gaseous Products of Digestion - energy lost by combustible gases which escape the body.

Urinary Energy is energy lost in the urine during intermediary metabolism.

Digestible energy is the usable portion of the ingested energy DE - UE = ME. The ME value of feeds is usually used when determining the energy requirements for pigs and chickens. Usually it is a more accurate measure of energy available for the animal.

Heat Increment or HI is the increase in heat after the animal consumes feed.

Net Energy NE = ME - HI. The amount of energy used for maintenance and/or production.

IV. PROTEIN

1. Composed of carbon, hydrogen, oxygen, nitrogen, and sometimes phosphorus and sulfur.

2. Protein contains approximately 16% nitrogen so: $\frac{\%\ N}{16\%} =$ Crude Protein = %N x 6.25

3. Protein consists of many molecules of amino acids (AA) joined by peptide linkages, i.e., $AA_1 - AA_2 - AA_3 -- AA_x$

Type of Protein:

1. True protein: that which is composed of only amino acids.

2. Nonprotein Nitrogen (NPN): compounds which are not true protein in nature but contain N and can be converted to protein by bacterial action.

3. Crude protein: that protein which is composed of true protein and any other nitrogeneous product. %N x 6.25 = Crude Protein.

4. Digestible protein: that portion of the crude protein which the animal can digest.

5. Essential amino acids: those amino acids which are essential to the animal and are needed in the diet because the animal's body cannot synthesize them fast enough to meet its requirement. Some of the most limiting amino acids (most difficult to supply in the diet) are: Lysine, Methionine, and Tryptophane.

Non-essential amino acids: Those amino acids which are not needed in the diet but are still essential for the animal.

Measure of Protein:

Protein quality refers to the amount and ratio of the essential amino acids.

Measure Used:

1. Biological value (BV): A measure of the relationship of protein retention to protein absorption; or the % of true absorbed protein that is utilized for maintenance and/or production. A protein with a BV of 70 or more (70% of the intake of N is retained) is considered capable of supporting growth if the caloric value of the diet is adequate. If less than 70%. the protein is less capable of supporting life.

Examples of Measurement	Biological Value
a. Whole egg protein	100%
b. Meat protein	72-79%
c. Cereal protein	50-65%

2. Net protein utilization (NPU) is a measure of protein quality expressing both the digestibility of the protein and the BV of the amino acid mixture absorbed from the intestine. NPU = BV x digestibility.

Barrel Concept Explaining Limiting Amino Acids: See Figure # 4.

In order to understand the concept of limiting amino acids, the barrel concept is most helpful. Consider the barrel as the structure which holds amino acids together, like peptide bands, and each stave of the barrel is an amino acid (essential or non-essential). Consider the barrel's purpose, holding water, as a special protein which, let us say, makes muscle. The amino acid and the amount of water the barrel will hold (to continue the analogy, muscle that will be made) is limited to the amount of lysine available. In the drawing, methionine is the next most limiting AA. TThe lengths of the other staves (amino acids) above the length of the lysine stave will not be used for holding water or making muscle. The nitrogen portion of these amino acids will be passed in the urine and the C,H, and O will be utilized as energy. This is a very inefficient method of supplying energy needs because:

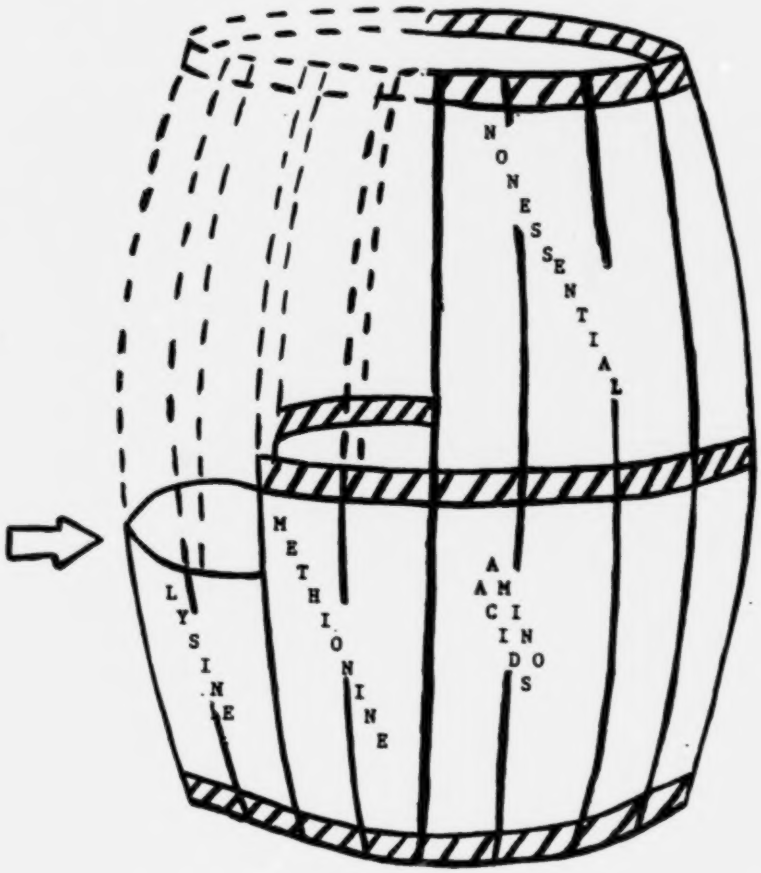
1. Protein, per unit of weight, is usually more expensive than carbohydrates.

2. The breaking down of protein to provide energy is stressful to the animal's system.

If a protein is not supplying all the essential amino acids in the right proportions at the critical time for growth and development, then the protein is not considered complete. Eggs and meats are usually considered complete proteins. No single plant protein is complete, but soybeans and peanuts come close.

Figure 4

BARREL CONCEPT CHART


NONESSENTIAL
AMINO ACIDS
METHIONINE
LYSINE

water
will only
be held
up to
this
level

LYSINE is the most limiting.

METHIONINE is the second most limiting

Lysine determines how much water the barrel will hold, or muscle that will be manufactured.

Complementary Proteins:

When a complete protein is not available, different feed ingredients can be combined which can provide a more complete protein. Examples of supplementary action between different proteins would be beef blood meal, which is low in isoleucine and high in lysine and tryptophan, and corn gluten meal, which is high in insoleucine and low in lysine and tryptophan. When combined one part BBM to 4 parts of CGM, the mixture provides all three amino acids in considerable amounts to promote growth.

The second example would involve soybean and sesame meal. Soybeans are high in lysine but low in methionine. Sesame is low in lysine but high in methionine. These two, when combined, provide a more complete protein.

Examples of complementary foods can be seen in food mixtures throughout the world: rice and beans, rice and lentils, and tahini (chickpeas and sesame paste).

Purpose/Function of Protein:

1. Essential for growing cells.
    a. Maintenance
    b. Production, i.e., eggs, meat, milk, and wool
    c. Reproduction
2. Included in the structure of:
    a. Enzymes
    b. Hormones
    c. Catalyst
    d. Antibodies
3. May be used for energy.

V. MINERALS

1. Inorganic elements.
2. The total mineral content of plants or animals is called ash.

Classification:

1. Major minerals: calcium, phosphorus, sodium, and chlorine.
2. Trace minerals: iodine, potassium, magnesium, manganese, sulfur, iron, zinc, copper, cobalt, and molybdenum.

3. Flourine and selenium are considered beneficial in small amounts but toxic if in excess.

General Function:

1. Skeletal formation and maintenance.
2. Constituent of nucleoproteins which are vital to all cellular activity.
3. Oxygen transport.
4. Chemical reaction in the body.
5. Fluid balance (osmotic pressure and excretions).
6. Regulates acid-base balance.
7. Help in enzyme system.
8. Mineral - vitamin relationship.

VI. VITAMINS

1. Organic in nature;
2. Dietary requirements of one or more species;
3. Necessary in small amounts;
4. Effective for metabolic activity but are not found in the structure portion of the body.

Types:

1. Fat soluble (ADEK);
2. Water soluble (Thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, biotin, choline, folic acid, & B_{12};
3. Isositol, paraamino-benzoic acid (PABA), and vitamin C.

SESSION TITLE: Units of Measure/Introduction to Metric II

SESSSION #30 WEEK #2 DAY #8 (30-2-8)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Each host country uses a common system of measuring but more often than not also has a system of its own. Therefore, it is important that the trainees know the common system, which most likely will be metric. The trainees will have little knowledge of the metric system coming from the United States nor will they be familiar with the host-country system. This session, units of measure, will give the trainees knowledge of the following:

- o Introduction to the metric system.
- o Introduction to the host-country system and how the two systems work together.
- o How to use these systems when laying out their plots and when planting. (All measurements will use the metric system.)

HAND-OUT: See : #3-d Host Country System
#3-e Area Measurements
#3-f Thai Units of Measure

READING ASSIGNMENT: Agriculture Math #4, Pgs 13-16.

SESSION TITLE: Poultry Feed and Nutrition

SESSION #31 WEEK #2 DAY #9 (31-2-9)

PRESENTER;

CO-FACILITATOR:

TIME: 6:00-8:00 C

INTRODUCTION: SESSION OBJECTIVES

Feeds and nutrition are extremely important to profitable animal production and during this session the trainees:

- o Will learn how to formulate their own feed rations for chickens.
- o Will discuss the pros and cons of different feeding options available under host-country conditions.
- o Will learn to mix feed ingredients in correct proportions following a standard recipe.

HAND-OUT: #31-a Feed Efficiency.

READING ASSIGNMENT: Practical Poultry Raising, Pgs 131-152.

TECHNICAL VOCABULARY:

Corn
Rice bran
Broken rice
Concentrate
Supplemental feed

Mineral
Oyster shells
Grit
Vitamins

HAND-OUT #31-a

FEED EFFICIENCY

FEED TO FOOD EFFICIENCY RATING BY SPECIES OF ANIMALS, RANKED BY PROTEIN CONVERSION EFFICIENCY
(Based on Energy as TDN or DE and Crude Protein in Feed Eaten by Various Kinds of Animals Converted into Calories and Protein Content of Ready-to-Eat Human Food)

Species	Unit of Production (as fed)	Feed Required to Produce One Production Unit				Dressing Yield		Ready-to-Eat: Yield of Edible Product (meat and fish deboned and after cooking)				Feed Efficiency[4]		Efficiency Rating			
		Pounds	TDN[1]	DE[2]	Protein	Percent	Net Left	As % of Raw Product (carcass)	Amount Remaining from One Unit of Production	Calorie[3]	Protein[3]	(lb feed to produce one lb product)		Calorie Efficiency[5]		Protein Efficiency[6]	
		(lb)	(lb)	(kcal)	(lb)	(%)	(lb)	(%)	(lb)	(kcal)	(lb)	(%)	(ratio)	(%)	(ratio)	(%)	(ratio)
Broiler....................	1 lb chicken	2.4[7]	1.94[8]	3,880	0.21[8]	72[13]	0.72	54[14]	0.39	274	0.11	41.7	2.4:1	7.1	14.2:1	52.4	1.9:1
Dairy cow....................	1 lb milk	1.11[7]	0.9[8]	1,800	0.1[8]	100	1.0	100	1.0	309	0.037	90.0	1.11:1	17.2	5.8:1	37.0	2.7:1
Turkey....................	1 lb turkey	5.2[7]	4.21[8]	8,420	0.46[8]	79.7[13]	0.797	57[15]	0.45	446	0.146	19.2	5.2:1	5.3	18.9:1	31.7	3.2:1
Layer....................	1 lb eggs (8 eggs)	4.6[7]	3.73[8]	7,460	0.41[8]	100	1.0	100[12]	1.0[12]	616	0.106	21.8	4.6:1	8.3	12.1:1	25.9	3.9:1
Rabbit....................	1 lb fryer	3.0[19]	2.20	4,400	0.48	55[19]	0.55	79[19]	0.43	301	0.08	35.7	2.8:1	6.8	14.6:1	16.7	6.0:1
Fish....................	1 lb fish	1.6[9]	0.98	1,960	0.57	65[10]	0.65	57[11]	0.37	285	0.093	62.5	1.6:1	14.5	6.9:1	16.3	6.1:1
Hog (birth to 200 lb)..........	1 lb pork	4.9[16]	3.67	7,340	0.60	70[16]	0.70	44[17]	0.31	341	0.088	20.4	4.9:1	4.6	21.5:1	12.7	7.8:1
Beef steer (yearling finishing period in feedlot)..........	1 lb beef	9.0[16]	5.85	11,700	0.90	58[16]	0.58	49[17]	0.28	342	0.085	11.1	9.0:1	2.9	34.2:1	9.4	10.6:1
Lamb (finishing period in feedlot)....................	1 lb lamb	8.0[16]	4.96	9,920	0.86	47[16]	0.47	40[17]	0.19	225	0.052	12.5	8.0:1	2.3	44.1:1	6.0	16.5:1

[1] TDN pounds computed by multiplying pounds feed (column to left) times percent TDN in normal rations. Normal ration percent TDN taken from M.E. Ensminger's books and rations, except for following: dairy cow, layer, broiler, and turkey from *Agricultural Statistics 1974*, p. 338, Table 518. Fish based on averages recommended by Michigan and Minnesota Stations and U.S. Fish and Wildlife.

[2] Digestible Energy (DE) in this column given in kcal, which is 1 Calorie (written with a capital C), or 1,000 calories (written with a small c). Kilocalories computed from TDN values in column to immediate left as follows: 1 lb TDN = 2,000 kcal.

[3] From *Lessons on Meat*, National Live Stock and Meat Board, 1965.

[4] Feed efficiency as used herein is based on pounds of feed required to produce 1 lb of product. Given in both percent and ratio.

[5] Kilocalories in ready-to-eat food ÷ kilocalories in feed consumed, converted to percentage. Loss = kcal in feed ÷ kcal in product.

[6] Protein in ready-to-eat food ÷ protein in feed consumed, converted to percentage. Loss = pounds protein in feed ÷ pounds protein in product.

[7] *Agricultural Statistics 1974*, p. 338, Table 518. Pounds feed per unit of production is expressed in equivalent feeding value of corn.

[8] Since pounds feed (column No. 2) per unit of production (column No. 1) is expressed in equivalent feeding value of corn, the values for corn were used in arriving at these computations. No. 2 corn values are TDN, 81%; protein, 8.9%. Hence, for the dairy cow 81% × 1.11 = 0.9 lb TDN; and 8.9% × 1.11 = 0.1 lb protein.

[9] Data from report by Dr. Phillip J. Schaible, Michigan State University, *Feedstuffs*, April 15, 1967.

[10] *Industrial Fishery Technology*, ed. by Maurice E. Stansby, Reinhold Pub. Corp., 1963, Ch. 26, Table 26-1.

[11] Ibid. Reports that, "Dressed fish averages about 73% flesh, 21% bone, and 6% skin." In limited experiments conducted by A. Ensminger, it was found that there was a 22% cooking loss on filet of sole. Hence, these values - 73% flesh from dressed fish, minus 22% cooking losses - give 57% yield of edible fish after cooking, as a percent of the raw, dressed product.

[12] Calories and protein computed back per egg; hence, the values herein are 100% and 1.0 lb, respectively.

[13] *Marketing Poultry Products*, 5th Ed., by E. W. Benjamin et al., John Wiley & Sons, 1960, p. 147.

[14] *Factors Affecting Poultry Meat Yields*, University of Minnesota Sta. Bull. 476, 1964, p. 29, Table 11 (Broilers).

[15] Ibid. Page 23, Table 10.

[16] Ensminger, M. E., *The Stockman's Handbook*, 4th Ed., Sec. XII.

[17] Allowance made for both cutting and cooking losses following dressing. Thus, values are on a cooked, ready-to-eat basis of lean and marbled meat, exclusive of bone, gristle, and fat. Values provided by National Live Stock and Meat Board (personal communication of June 5, 1967, from Dr. Wm. C. Sherman, Director, Nutrition Research, to the senior author), and based on data from *The Nutritive Value of Cooked Meat*, by Ruth M. Leverton and George V. Odell, Misc. Pub. MP-49, Appendix C, March 1958.

[18] Estimates by the authors.

[19] Based on information in *Commercial Rabbit Raising*, Ag. Hdbk. No. 309, USDA, 1966, and *A Handbook on Rabbit Raising*, by H. M. Butterfield, Washington State College Ext. Bull. No. 411, 1950.

From: Feeds and Nutrition—Complete, by M. E. Ensminger and C. G. Olentine,
Jr., published by the Ensminger Publishing Company, P.O. Box 429, Clovis,
California, U.S.A. 93613, with the permission of the publisher.

SESSION TITLE: Plant Water Requirements

SESSION #32 WEEK #2 DAY #9 (32-2-9)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-10:00 F

INTRODUCTION: SESSION OBJECTIVES

Water for irrigating all types of crops in the host-country, comes from many sources. The most commonly depended on is nutural rainfall which falls in undependable amounts at unpredictable times. Therefore, vegetables and field crops alike could need supplemental irrigation at times to ensure normal production. This session will give the trainees experience:

- In determining crop needs, shallow and deep root types.
- In developing water sources.
- In watering techniques, for different types of plants.
- In mulching to prevent erosion and improve water retention of most soils.

HAND-OUT: #32-a Watering Vegetables

READING ASSIGNMENT: Intensive Vegetable Gardening, Pgs 95-103.

TECHNICAL VOCABULARY:

Irrigation
Plant stress
Water can
Furrow
Wilting
Mulching
Sprinkle

WATERING VEGETABLES
WHEN? HOW OFTEN? HOW MUCH?

There are no quick and easy methods for determining how much water plants need and how often it should be applied. The so-called "shiny" or "shiny layer" method popularized in some garden books just isn't reliable enough. (With this method, the soil supposedly has received enough water when a shiny layer of water remains on the soil surface for a certain number of seconds when watering is stopped). However, if you're willing to learn some fairly straightforward concepts and figures, you'll be able to greatly improve on "eyeball" methods. Here goes:

1. The frequency and amount of watering plants need depend on: soil texture, root depth, crop stage, crop type, temperature, humidity, and wind. As temperature and/or wind increase and humidity decreases, water needs go up. We'll cover the other factors farther on.

2. Sandy soils need more frequent (about twice as often) but lighter waterings than clayey soils since they can store only about half as much water per unit of depth.

3. The shallower the root system of the soil, the more often watering is needed. Tiny seedlings with roots only a few centimeters deep may need water 1-2 times a day on a very sandy soil and once every 1-2 days on a clay or clay loam soil (depending on temperature, humidity, and wind). As roots grow deeper, watering intervals can by spread out. However, well-established lettuce, onions, cabbage, and other naturally shallow rooted crops will need more frequent (but lighter) waterings than tomatoes, eggplant, field corn, and other deeper rooted crops.

4. Crops themselves vary in the weekly and total amounts of water needed to grow them, but there's much more variation among field crops than among vegetables. Millet is the most drought resistant, followed by sorghum, and then peanuts and cowpeas.

5. Plant demand for water increases with growth and reaches a peak around flowering or fruiting time which continues until harvest is over for vegetables. Field crops which are harvested in a much more mature state (hard, dry seeds) taper off from this peak as maturity seets in.

   Some useful figures: In warm weather, most very young plants will use about 19-25 mm (1.9-2.5 cm or 0.75-1.0") of water per week. This is equivalent to filling up a flat tub that is as big as the planted area to a depth of 19-25 mm. This includes soil evaporation and plant usage.

1" of water = 7 gallons (25 liters) per sq meter.

Peak usage rates for established crops run around 45-75 mm (4.5-7.0 cm or 1.75-2.75") a week, depending on temperature, wind, relative humidity, and crop type (not a real important factor with vegetables). This equals 12-19 gallons (45-70 liters) per sq meter (11 sq ft) per week.

6. Surprised at the high amount of water established plants need? That's the reason why most people overwater young plants (in terms of frequency and amount) and underwater older plants by putting on too little too often. Shallow watering produces a shallow root system, since roots won't penetrate into dry soil. It's a self-perpetuating cycle since the plants begin showing moisture stress signs far too soon after each watering, which sets them up for more of the same treatment.

   On the other hand, putting too much water on can cause drainage problems and leaching losses of nutrients like nitrogen and also accentuate soil-borne fungal and bacterial diseases. Watering too often (regardless of quantity) promotes "damping off" in seedlings and fungal and bacterial leafspots in older plants plus soil-borne fungal, bacterial wilts. NOTE: 1 mm = 1 liter per sq m

   Pre-irrigation: Farmers in low rainfall, irrigated areas should usually pre-irrigate the soil to full eventual rooting depth before planting to avoid getting behind later on in the season when demand really increases. It's a good idea, since the water will not be lost except for a small amount that evaporates from near the soil surface. The only water that drains downward is excess water that the soil's small pore spaces can't hold. Check the PC/ICE Soils, Crops and Fertilizer Manual (pp. 15-16) for a full explanation.

HOW CAN I TELL WHEN PLANTS NEED WATERING?

Wilting, leaf curling (or rolling), and, in some cases, color changes (maize turns bluish green, bean leaves turn dark green) are the initial signs of moisture stress (lack of water). Yellowing and eventual browning ("firing") of the leaves, starting at the tips, are very advanced symptoms that occur after days of continuous moisture stress. However, most of these symptoms can also be caused by anything else that interferes with water uptake or water transport such as nematodes, soil insects, fungal and bacterial wilts, stem borers, and even very high temperatures. N deficiency can cause yellowing too.

Although young plants can usually tolerate the initial symptom (wilting, curling, color change) without any significant yield drop, older plants (especially those that are flowering and fruiting) should not be allowed to reach this stage or yields may be seriously affected. For example, if corn wilts for 2-4 days during pollination, yields are usually cut by 50%.

Now for some more guidelines:

Very young plants: When roots are very shallow, you can use a simple "scratch" test. Take your finger and scratch down a few centimeters. If the soil is dry more than 2-3 cm down, it may be time to water if seedlings are small and still shallow rooted. Look at the seedlings too for signs. Remember, young seedlings need frequent but light waterings; frequency will depend on weather and soil texture as well as root depth.

Older Plants:

Check over the water quantity guidelines on the previous page. As plants get older, you want to make less frequent but larger applications. The amount per application will range from about 25-65 mm (1-2.5" or about 25-65 liters per sq meter) and will depend on weather, soil texture, and root depth. The frequency will be inversely proportional to the amount applied and will vary from about one up to as much as 3 times a week. For example, in warm weather, cabbage might need two 30 mm waterings per week since it's shallow rooted, while deeper rooted tomatoes might require a 60 mm watering (60 liters/sq meter) once every 4-6 days. Remember that hardpans and excessive subsoil compaction can restrict root growth.

Other Guidelines for Older Plants:

Another guide is to apply water before one half of the root zone's available water has been used up. Sounds complicated, but hold on. Plants take up about 40% of their water needs from the top quarter of the root zone; once this top quarter gets down to 0% available water, it will soon be time to apply more. You can get a very good estimate of the percentage of available water remaining by using the "squeeze test" on p. 153 of the Soils, Crops, and Fertilizer Use Manual (don't confuse this with the "feel" test of texture.)

Measuring the Depth that Water has Penetrated:

Use a 10-15 mm (about 0.5") diameter iron rod about 1-1.5 mm long that is slightly tapered at one end. Wait about 1/2-1 day after watering and then push it into the ground. It should penetrate fairly easily until it strikes dried out soil (hardpans may affect the accuracy of this method).

What about Rainfall:

Buy a rain gauge or make one out of a tin can for checking rainfall, since its frequency and amount will affect the need for supplemental watering. Amounts much below 6 mm (1/4") aren't much use to plants, since much of this is lost by evaporation from the upper soil surface. Don't try to "eyeball" rainfall - it's very deceiving. Remember also that heavy downpours result in a lot of useless water runoff.

What about the best time of day to water?

This is important for minimizing "damping off" problems with seedlings and fungal and bacterial leafspots with older plants. Water in the morning whenever possible to give the foliage and the soil surface opportunity to dry out as the day wears on. Watering late in the afternoon is not a good practice. You can water in the heat of the day without fear of "burning".

Application Tips:

Water gently to avoid splashing and erosion, especially when plants are young and the soil exposed. When possible, avoid watering the leaves themselves to help cut down on foliar diseases.

SESSION TITLE: Maintenance and Weeding

SESSION #33 WEEK #2 DAY #39 (33-2-9)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

Maintenance and weeding are both important in assuring high yields. The theory is that a clean, weed free plot looks and produces better. The schedule is set to have one maintenance session of 2 hours every week. 30 minutes of each session should be used to review or emphasize a completed session in which there was insufficient time to cover all of the important points. The trainees will:

- o Benefit by better understanding the need for weeding.
- o Understand the importance of thinning and plant spacing.
- o Benefit by weed identification.
- o Know when and why to clean plots and maintain bed shape.
- o Benefit by basic introduction to fertilizer and water use.

HAND-OUT: #33-a Plot Maintenance

READING ASSIGNMENT: Intensive Vegetable Gardening, Pgs. 127-129.

TECHNICAL VOCABULARY:

Weeds
Thinning
Herbicide
Root

Maintenance
Water can
Fertilizer

HAND-OUT #33-a

PLOT MAINTENANCE AND WEEDS

When you work on a small-scale farm, most of the plot maintenance is likely to be hands-on, because it is not necessary to use chemical control on a small-scale, such as home gardens. You should cover all these subject while working in your plot.

1. Thinning is done to avoid competition between the plants themselves. Usually, if you have good seeds, planting one in each hole should be enough. If you plant more than 1 seed, after 7-10 day select the strongest one and pull the others out. Try to avoid root damage.

Corn:	1 plant every 40 cm spacing
Mung bean, soybean:	1 plant every 10 cm spacing
Cucurbits:	4 plants every hill

2. Weed Control:

Weed is generally defined as any plant that is out of place. The chances of getting low quality and/or low quantity yields or crop damage can be affected by weeds. To control the weeds, and prevent competition with crop plants they should be removed or killed while they are still small, to avoid injury to the crop's root system. Controlling weeds by hand pulling and hoeing are commonly used in small gardens. After weeding you should water the crop so that the root damage and loss of water will not be so severe.

Using chemical weed controls are mainly for big areas of vegetables or for field crops. This method can avoid physical damage to the crop root system, but the cost is substantial and each herbicide must be used as prescribed by the manufacturer. Different species of weeds require the use of appropriate herbicides, and sometimes mixtures of two or three are needed to cope with all species. A few herbicides leave a residual toxicity in the soil that affects other succeeding crops. Chemical control measures for weed control usually produce the greatest benefits when applied while weeds are still small or before germination.

3. Watering:

In the raining season, this is not much of a problem; some field crops such as corn and beans can grow on only rain water. The way to check and see whether they need to be watered or not is to take some topsoil about 3 cm. deep. If you can press the soil in your hand and the soil sticks together, the moisture is enough. Vegetables need more moisture than field crops and a deeper level of moisture can help the vegetables to develop a better root system.

4. Fertilizer Needs:

If the deep water penetration in the soil is very poor, manure can help with soil structure, but not much for fertility. If plants look too weak we can help by putting some 15-15-15 chemical fertilizer on by:

Side dressing: Opening the soil at the side of the plants, sprinkling in fertilizer, covering and watering.

* Be careful if plants are too small. An over dosage can make them wilt.

SESSION TITLE: L.S.S. Project and Crossover Roles

SESSION #34 WEEK #2 DAY #9 (34-2-9)

PRESENTER:

CO-FACILITATOR:

TIME: 13:30-15:00 C

The Session Design for this PS Session is in Appendix A.

SESSION TITLE: Traditional Rice Production Techniques

SESSION #35 WEEK #2 DAY #10 (35-2-10)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Rice ,being the staple food for virtually millions of people in the host-country as well as a major export commodity makes it extremely important to the economy. If the trainees encounter rice production at their sites it will very likely be on a small scale and not involve commercial production. Therefore it is recommended that trainees learn the basics of rice production for credibility with their students and co-workers at their sites. This session will give them a brief overview of rice production that will enable them:

- To understand the most common methods of land preparation.
- To know how and why rice seedlings are grown.
- To understand the basic botany and growth cycle of the rice plant.
- To understand how chemicals are used to increase yields i.e. fertilizers, insecticides and fungicides.
- To know the basic water requirement of rice and how it can affect yields.
- To learn the techniques of transplanting and harvesting used in different areas of the host-country.

HAND-OUTS: #35-a Rice Production Costs
#35-b Rice Growth
#35-c Rice Plant Parts

READING ASSIGNMENT: *Guide for Field Crops in the Tropics and Sub-Tropics.* Pgs 42-59.

TECHNICAL VOCABULARY:

- Rice seed
- Harrow
- Insecticide
- Stem
- Panicle
- Flow
- Fertilizer
- Harvest
- Broadcast
- Seedling
- Tractor
- Transplant
- Tiller

HAND-OUT #35-a

COST OF RICE PRODUCTION IN AGRO - ECONOMIC REGION 3, 1981/82 1/
(KHON KAEN, MAHASARAKHAM AND ROI-ET)

COST ITEM	QUANTITY/RAI	VALUE (BAHT)/RAI
Labor		
- Nursery	0.17 MD	4
- Land preparation	3.34 MD	84
- Transplanting	4.76 MD	119
- Weeding	0.56 MD	14
- Fertilizer Application	0.24 MD	6
- Pesticide Application	0.12 MD	3
- Irrigation	0.32 MD	8
- Harvesting and Thrashing	7.59 MD	190
Animal	3.30 AD	83
Machinery	-	43
Seed	-	17
Manure	-	1
Fertilizer	-	15
Pesticide	-	5
Fuel	-	3
Equipment and repair	-	6
Interest	-	36
Land rent and Depreciation	-	146
TOTAL		783

1/ Office of Agricultural Economics, MOAE Cost of Rice Production 1981/82

MD = Man-day (8 hours per day)
AD = Animal-day (6 hours per day)

* Note: Production will vary from area to area with the range of 200-1,000 kg/rai.

Paddy value at present is approximately 2.5 baht/kg.

HAND-OUT #35-b

RICE GROWTH

VOCABULARY

Tillering
Primary tiller
Secondary tiller
Tertiary tiller
Senesence
Translocation
Broadcast
Transplant
Primordia

STAGES OF GROWTH

0 - Germination
1 - Seedling
2 - Tillering
3 - Stem elongation
4 - Panicle initiation
5 - Panicle development
6 - Flowering
7 - Milk grain
8 - Dough grain
9 - Mature grain

SOME QUESTIONS

1) Do all tillers produce grain?

2) Does high tillering raise yields?

3) When is fertilizer applied, what kind of fertilizer, and how is it applied?

4) When are insecticides applied?

5) What are the advantages of transplanting rice?

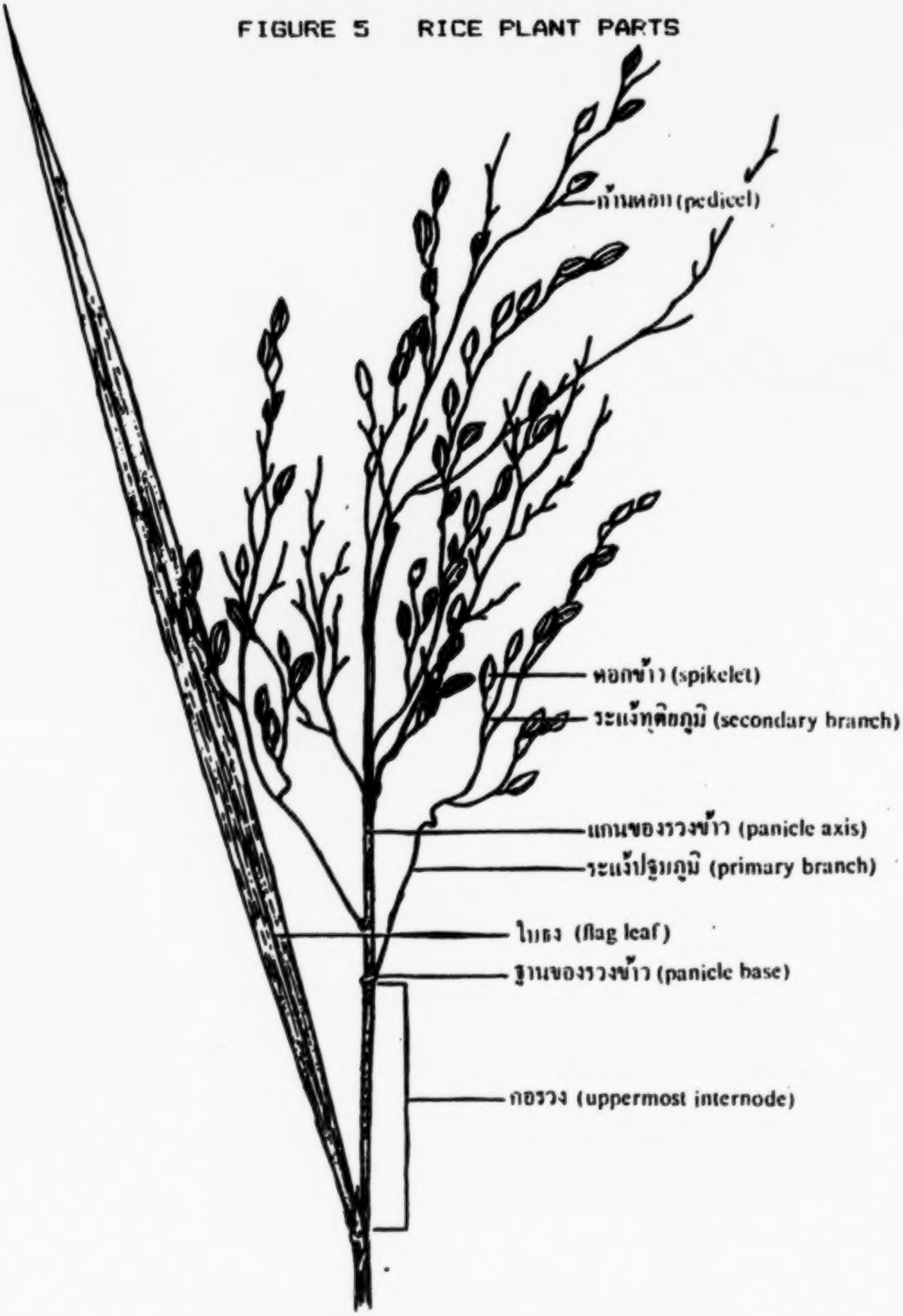
6) What are the advantages of direct seeding rice?

7) What do the letters "HYV" stand for?

8) What is IRRI?

HAND-OUT #35-c

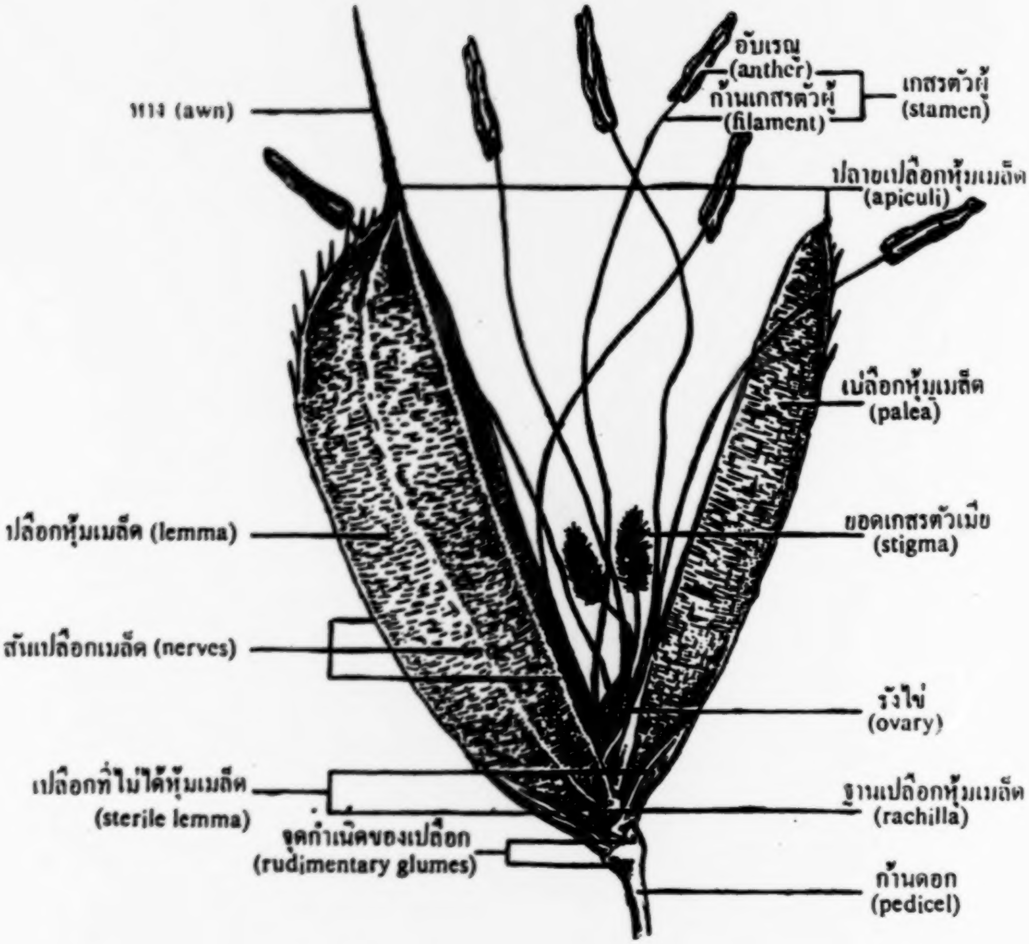
FIGURE 5 RICE PLANT PARTS


ก้านดอก (pedicel)
ดอกข้าว (spikelet)
ระแง้ทุติยภูมิ (secondary branch)
แกนของรวงข้าว (panicle axis)
ระแง้ปฐมภูมิ (primary branch)
ใบธง (flag leaf)
ฐานของรวงข้าว (panicle base)
คอรวง (uppermost internode)

ส่วนต่าง ๆ ของช่อดอก (ภาพแสดงให้เห็นเพียงบางส่วน)

HAND-OUT #35-c (CONTINUED)

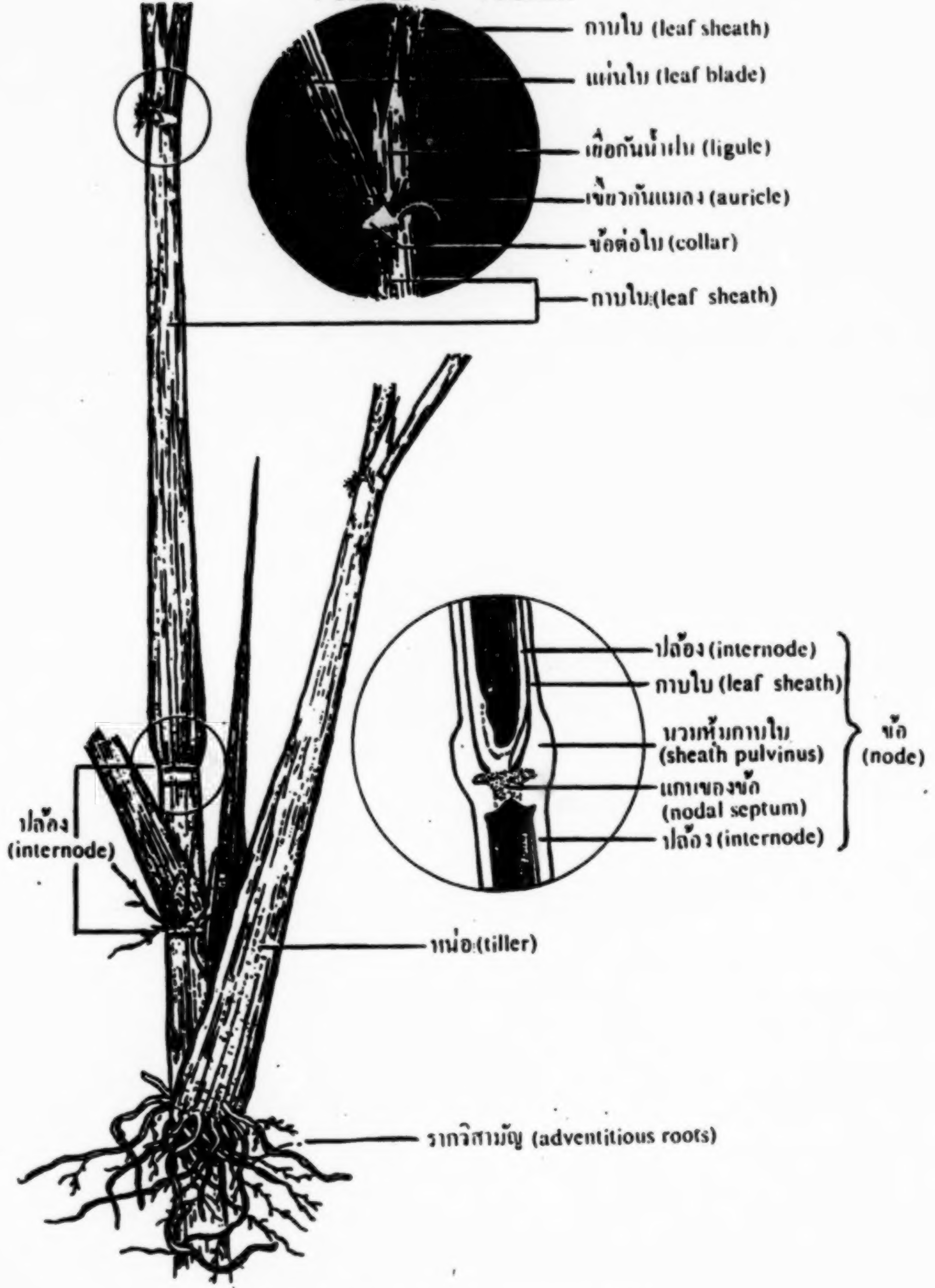
FIGURE 6 SPIKELET


หาง (awn)
อับเรณู
(anther)
ก้านเกสรตัวผู้
(filament)
เกสรตัวผู้
(stamen)
ปลายเปลือกหุ้มเมล็ด
(apiculi)
เปลือกหุ้มเมล็ด
(palea)
เปลือกหุ้มเมล็ด (lemma)
ยอดเกสรตัวเมีย
(stigma)
สันเปลือกเมล็ด (nerves)
รังไข่
(ovary)
เปลือกที่ไม่ได้หุ้มเมล็ด
(sterile lemma)
ฐานเปลือกหุ้มเมล็ด
(rachilla)
จุดกำเนิดของเปลือก
(rudimentary glumes)
ก้านดอก
(pedicel)

ส่วนต่าง ๆ ของดอกข้าว

HAND-OUT #35-c (CONTINUED)

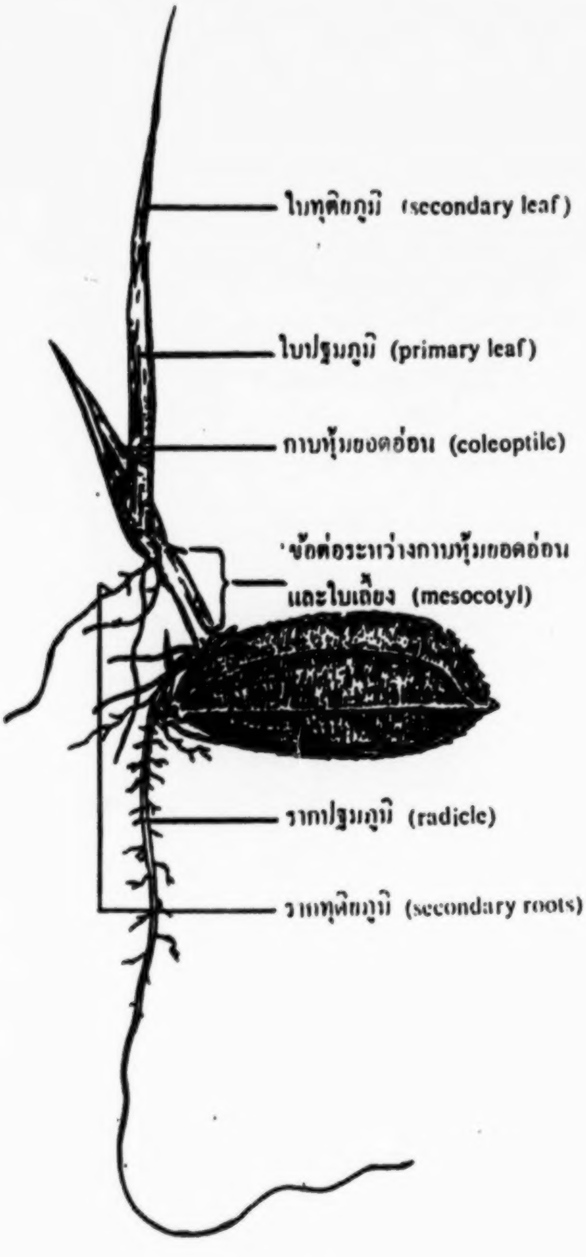
FIGURE 7 TILLER


กาบใบ (leaf sheath)
แผ่นใบ (leaf blade)
เยื่อกันน้ำฝน (ligule)
เขี้ยวกันแมลง (auricle)
ข้อต่อใบ (collar)
กาบใบ (leaf sheath)
ปล้อง (internode)
กาบใบ (leaf sheath)
นวมหุ้มกาบใบ (sheath pulvinus)
แกนของข้อ (nodal septum)
ปล้อง (internode)
ข้อ (node)
ปล้อง (internode)
หน่อ (tiller)
รากวิสามัญ (adventitious roots)

ส่วนต่าง ๆ ของหน่อแรกและหน่อที่สอง

HAND-OUT #35-c (CONTINUED)

FIGURE 8 RICE SEED SPROUT


ใบทุติยภูมิ (secondary leaf)
ใบปฐมภูมิ (primary leaf)
กาบหุ้มยอดอ่อน (coleoptile)
ข้อต่อระหว่างกาบหุ้มยอดอ่อน และใบเลี้ยง (mesocotyl)
รากปฐมภูมิ (radicle)
รากทุติยภูมิ (secondary roots)

ส่วนต่าง ๆ ของต้นกล้าที่งอกในที่มืดหรือถูกฝังลึกใต้ผิวดิน

SESSION TITLE: Introduction to Tropical Crop Management

SESSION: #36 WEEK #2 DAY #10 (36-2-10)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:30 C

INTRODUCTION: SESSION OBJECTIVES

Tropical crop management, unlike that for temperate climates, requires much closer attention and awareness of detail--for many reasons. This session will cover the "what" and the "how" of tropical crop management and give trainees a much improved understanding in the following areas:

- Tropical crop management techniques.
- Integrated farming systems of the host-country.
- The benefits of intercropping and which crops are the most suitable for it.
- Cropping systems suitable for host-country conditions and the basic crops used. (Domestic and export.)
- How to implement an improved crop management system.
- The importance of record keeping, the key to profits.

HAND-OUT: #36-a Cost Effective Cropping Techniques

READING ASSIGNMENT: Guide for Field Crops in the Tropics and Sub-Tropics, Pgs 22-41.

HAND-OUT #36-a

COST EFFECTIVE CROPPING TECHNIQUES

Items Limiting Profit	Items that Increase Profit	Items that Reduce Profit
Sale Price	Higher yield	Low yields
Yield	Lower production cost	Improper use of fertilizers
Quality	Proper use of fertilizers	Improper timing of applications
Credit	Proper timing of applications	Inadequate amounts of fertilizer and poor timing.
Distance to market	Proper amounts	Scheduled spraying
Supply	Insect monitoring	No insect monitoring
Demand	Timely spraying	Delayed harvest
	Proper insecticides and amounts	High field losses
		Low quality
	Optimum plant populations	Lack of water
	Higher quality seed	Lack of record keeping
	Hybrid seeds	
	Irrigation where possible	
	Timely harvest	
	Accurate record keeping	

SESSION TITLE: Quiz I

SESSION #37 WEEK #2 DAY #10 (37-2-10)

PRESENTER:

CO-FACILITATOR:

TIME: 15:30-16:30 C

INTRODUCTION: SESSION OBJECTIVES

Trainees have had almost two weeks of agricultural training and should have by this time begun to understand the basic concepts which have been presented in this training program. At this point, it is important to assess how well trainees are assimilating the knowledge presented to them--in order to fine-tune future sessions. A written quiz is needed to assess conceptual learning and plot evaluations can be performed to assess hands-on skills. The Objectives are:

- To gauge trainee understanding of those agricultural concepts presented to date.
- To measure trainee assimilation of information.
- To test and practice adaptation to the metric system.

HAND-OUT: none

READING ASSIGNMENT: Review hand-outs and reading assignments.

TECHNICAL VOCABULARY:

Test/quiz	Question
To grade	Answer

SESSION TITLE: Field Trip: Fish

SESSION #38 WEEK #2 DAY #11 (38-2-11)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

Field trips have at least two purposes. This one is no exception. Field trips are important in that they give the trainees a much needed break from the heavy schedule of the training program and at the same time they learn another agriculture related skill. This field trip to a fish raising facility will:

- Give the trainees exposure to commercial fresh water fish farming.
- Show how it can fit into an agricultural program when they reach their site.
- Learn the different species grown in the host-country and how to take care of each.

TECHNICAL VOCABULARY:

Fish varieties
Release
Fingerling
Pond
Plastic bags

SESSION TITLE: Training Evaluation I

SESSION #39 WEEK #2 DAY #11 (39-2-11)

PRESENTER:

CO-FACILITATOR:

TIME: 15:00-16:30 C

INTRODUCTION: SESSION OBJECTIVES

Trainees and trainers discuss how each person feels physically, emotionally and mentally. Then, trainees and trainers separately list technical performance objectives that have been fulfilled. When the two lists are compared, trainees will better understand what is expected of them and trainers will gain insights about trainee expectations of themselves and training. Feedback from trainees is needed for staff to assess the progress of training. It is important to sound out everyone's thoughts and feelings in a large group to establish feedback as a behaviour. Also, it will allow trainees to be more confident and willing to give opinions.

Objectives are:

- To assess trainees' emotions about the first weeks of training;
- To clarify any questions that trainees have concerning training and review progress so far;
- To seek feedback, criticism and suggestions.

HAND-OUT: none

READING ASSIGNMENT: none

TECHNICAL VOCABULARY: none

SESSION TITLE: Fowl Pox Vaccinations

SESSION #40 WEEK #2 DAY #12 (40-2-12)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:30 F

INTRODUCTION: SESSION OBJECTIVES

We have already discussed the importance of vaccination as a disease prevention management practice. In this session we will:

- Vaccinate broiler chicks for fowl pox by the wing stab method.
- Identify the typical local vaccination schedule and discuss how it varies for different types of chickens and in different seasons.

HAND-OUT: See Hand-out #16-a Chicken Vaccination Program

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Vegetable Characteristics

SESSION #41 WEEK #2 DAY #12 (41-2-12)

PRESENTER:

CO-FACILITATOR:

TIME: 9:30-11:00 C

INTRODUCTION: SESSION OBJECTIVES

Since the major portion of the trainees' work will involve growing small vegetables, it is essential they know the families of each type; therefore, they will be able to identify and distinguish the characteristics of the important vegetable families. In this session the trainees:

- o Will be able to identify each vegetable family important to the host-country.
- o Will know the growing habits of important vegetables.
- o Will learn about direct seed and transplant varieties.
- o Will understand how each vegetable is grown and used in the host-country.
- o Will identify root crops from leafy types.

HAND-OUT: #41-a Vegetable Families

READING ASSIGNMENT: Crop Production Handbook, Pgs 22-40.

HAND-OUT #41-a

VEGETABLE FAMILIES

MONOCOTYLEDONEAE (Monocots)	พืชใบเลี้ยงเดี่ยว
GRAMINEAE (Grasses)	ตระกูลหญ้า
SWEET CORN	ข้าวโพดหวาน
Lemon grass	ตะไคร้
ARACEAE (Arum family)	
Taro	เผือก
LILIACEAE (Lily family)	
Chinese chive	กุ่ยช่าย
Garlic	กระเทียม
Leek	กระเทียมต้น
Shallot	หอมแดง
Multiply onion	หอมแบ่ง หรือ หอมต้น
Onion	หอมหัวใหญ่
ZINGIBERACEAE (Ginger family)	
Ginger	ขิง
DICOTYLEDONEAE (Dicots)	พืชใบเลี้ยงคู่
CHENOPODIACEAE (Goosefoot family)	
Spinach	ปวยเหล็ง
CRUCIFERAE (Mustard family)	
Cauliflower	กะหล่ำดอก
Cabbage	กะหล่ำปลี
Kale	คะน้า
Chinese mustard	ผักกาดกวางตุ้ง
Chinese cabbage	ผักกาดขาวปลี
Leaf mustard	ผักกาดเขียวปลี
Japanese radish	ผักกาดหัว
LEGUMINOSAE (Legumes)	
Common bean	ถั่วแขก
Winged bean	ถั่วพู
Yard long bean	ถั่วฝักยาว
Sugar pea	ถั่วลันเตา
MALVACEAE (Mallow family)	
Okra	กระเจี๊ยบ
Roselle	กระเจี๊ยบแดง
UMBELLIFERAE (Parsley family)	
Coriander	ผักชี
Parsley	ผักชีฝรั่ง

CONVOLVULACEAE (Morning glory family)

Morning glory	ผักบุ้ง
Sweet potato	มันเทศ

SOLANACEAE (Nightshade family)

Sweet pepper	พริกยักษ์
Chili	พริกขี้หนู
Eggplant	มะเขือ
Tomato	มะเขือเทศ
Potato	มันฝรั่ง

CUCURBITACEAE (Gourd family)

Bottle gourd	น้ำเต้า
Cucumber	แตงกวา
Muskmelon	แตงเทศ
Watermelon	แตงโม
Ivy gourd	ตำลึง
Smooth loofah	บวบหอม
Angled loofah	บวบเหลี่ยม
Wax gourd	ฟัก
Pumpkin	ฟักทอง
Bitter gourd	มะระ
Thai melon	แตงไทย

COMPOSITAE (Composite family)

Chrysanthemum	ตั้งโอ๋
Lettuce	ผักกาดหอม

LIBIATAE

Sacred basil	กะเพรา
Hoary basil	แมงลัก
Peppermint	สะระแหน่
Sweet basil	โหระพา

FIELD CROPS

Rice	ข้าว
Corn	ข้าวโพด
Sugar cane	อ้อย
Cassava	มันสำปะหลัง
Soybean	ถั่วเหลือง
Mung bean	ถั่วเขียว
Peanut	ถั่วลิสง
Marigold	ดอกดาวเรือง

SESSION TITLE: Seed Germination Results

SESSION #42 WEEK #2 DAY #12 (42-2-12)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

This session is a follow up to record and discuss the results of Session #20, week #1, day #5. If there are trainees that had no results they should be encouraged to perform a second test on their own time.

Week #3

43	3	13	Plant Nutrition Basics/ Determining Fertilizer Needs	08:00-10:00	F/C
44	3	13	Pig Feed and Feeding	10:00-12:00	F/C
-	-	-	L/CC	13:30-16:30	-
45	3	14	Introduction to Fish Farming	08:00-10:00	F/C
-	-	-	L/CC/Dev	10:00-12:00	-
-	-	-	L/CC	13:30-16:30	-
46	3	15	Plant Propagation	08:00-10:00	F/C
47	3	15	Staking and Trellising/ Maintenance	10:00-12:00	F
-	-	-	L/CC	13:30-16:30	-
48	3	16	Basic Soils	08:00-10:00	F/C
49	3	16	Using Chemicals and Chemical Fertilizers - Introduction to Metric III	10:00-12:00	F/C
50	3	16	LSS School Field Trip	13:00-17:00	F
51	3	17	Insect Identification	08:00-10:00	F/C
52	3	17	Mushroom Production	10:00-12:00	F/C
-	-	-	L/CC	13:30-16:30	-
53	3	18	Field Trip: Integrated Farm	08:00-12:00	F

SESSION TITLE: Plant Nutrition Basics/Determining
Fertilizer Needs

SESSION #43 WEEK #3 DAY #13 (43-3-13)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Soils in most host countries are extremely poor and the addition of plant nutrients is not a common practice. Therefore it is important for the trainees to know:

- What basic nutrients are required by most plants for normal production.
- How to determine what specific plants need.
- Which elements are available and in what form.
- Ways most suitable for adding these elements and when to add them.
- The appropriate source of supply.
- The relationship among soil, water and plant nutrients.
- Soil pH and its effect on normal plant growth.

HAND-OUT: #43-a Source of Plant Nutrients.

READING ASSIGNMENT: *Soils, Crops and Fertilizer Use*, Pgs 20-30, 44-49, 65-67 and 90-94.

TECHNICAL VOCABULARY:

Corn
Legumes
Fertilizer
Lime
Sulfur
Compost
Organic
pH Values
Deficient
Toxic
Macro nutrients
Micro nutrients
Manure

HAND-OUT #43-a

SOURCE OF PLANT NUTRIENTS

INTRODUCTION

Plants require food like people and animals. Plants take food from the soil like people eat from the bowl with the soil being the most effective store-house of plant nutrients. Some soils are depleted and would be classed as empty store house i.e. sandy soils. Generally soils suited for agriculture are low in plant nutrients, therefore, nutrients in the form of manure or commercial fertilizers must be added.

1. THREE GROUPS OF ESSENTIAL PLANT NUTRIENTS

We can break down plant residue by chemical analysis into at least 17 elements, which are essential elements for normal plant growth and yield. If one of these elements is unavailable in the soil the plants will show signs of deficiency. This will reduce the quantity and quality resulting in lower yield and profit.

In the following table you can see the importance of the top 14 plant nutrients and the amounts required for maximum yield. These could be classified into three groups such as the primary, secondary and trace elements.

GROUP	ELEMENT	AMOUNT IN PLANT KG/HA	OTHER GROUP NAME
Primary element	N	100	Macro nutrient Major nutrient
	P	15	
	K	100	
Secondary element	Ca	50	Micro nutrient Minor nutrient
	Mg	15	
	S	30	
Trace element		(GM/HA)	
	Fe	600	
	Zn	200	
	Cu	100	
	B	200	
	Mo	10	
	Mn	600	
	Co	1	
	Cl	?	

Source: After Cooke, 1980. Fertilizing for Mixiaum Yield.

2. NUTRIENTS DERIVED FROM SOIL AND ATMOSPHERE

Most plant nutrients are available in the topsoil of the earth's surface with small amounts coming from the atmosphere.

ELEMENT	FORMS, USED BY PLANTS	SOURCE
C	C, CO_2	Air, soil
H	H^+, -Hom	Water
O	O_2 OH^-, CO_3^{-2}	Air, water
N	NH^+, NO_3^-	Organic matter, soils, fertilizers
P	$HPO_4^=$, $H_2PO_4^-$	Soil, fertilizers
K	K^+	Soil, fertilizers
Ca	Ca^{++}	Soil, lime
Mg	Mg^{++}	Soil, dolomite
S	$SO_4^=$	Soil, gypsum, sulfur powder, compound of fertilizers
Fe	Fe^{++} Fe^{+3}	Soil, compound of $SO_4^=$ or chelate
Zn	Zn^{+2}	Soil, compound of SO_4^+ or chelate
Cu	Cu^{+2}	Soil, compound of oxide
B	$H_2BO_3^-$, $B(OH)_4^-$	Soil, Borax
Mo	MoO_4^{-2}	Soil, compound of molybdate
Mn	MnO_4	Soil
Co	?	Soil
Cl	Cl^-	Soil, fertilizer compound

3. SOURCES OF PLANT NUTRIENTS

As mentioned above, most soils used to produce agricultural crops need many of the essential elements added for normal crop production. The materials that we add to the soil are fertilizers and may be classed into two groups.

a. Organic manures and compost, which are basically decomposed organic materials, that act as a soil conditioner as well as supplying appropriate amounts of nutrients depending on their source.

b. Chemical fertilizers are compounds synthesized by a chemical process.

4. SOURCES OF PLANT NUTRIENTS

Organic materials are considered the outstanding source of plant nutrients and the most important for soil improvement and conservation. The physical and chemical properties of soil care are best supplied by living residue. Listed below are three ways you may collect and store organic materials for mixing with agricultural soils.

a. Farmyard manure, of which most are ready to mix with the soil prior to sowing seeds. You may spread manure over the soil then plow under or harrow until thoroughly mixed with the topsoil. If you have large quantities of manure collected and piled it should be protected from the weather by covering, until applied to the fields.

b. Compost, which you will learn to make, is an excellent source of plant food. Almost any type of crop residue can be added to the compost pile and if kept moist and turned can be applied to the soil within 5 months. Making compost is not difficult and is an excellent soil conditioner but care should be taken to preserve and protect the organism activities. Crop residue or any plant material will decompose by organisms that are kept alive with proper moisture, aeration, temperature and sufficient microbe food. Proper care reduces the time required for preparing quality compost.

c. The third method of adding organic material to the soil is green manure. The term green manure means that a growing crop is plowed into the soil and decomposes later. The most widely used crops for this purpose are legumes of which there are many varieties to choose from. The flowering stage of these legumes is the proper time for incorporating into the soil for maximum yield, in Kg/Rai.

d. Chemical Fertilizers: Chemical fertilizers are compounds of which we know the composition of each element and we may calculate the amount of plant nutrient needed for each application. Most chemical fertilizers are soluble in water and therefore the nutrients stay in the soil suspension and move easily through the root zone for uptake by the plants. Proper application rates and placement are extremely important to prevent injury to the plants.

The three most common forms of commercial fertilizers are (N) nitrogen, (P) phosphorus and (K) potassium.

NITROGEN, PHOSPHORUS AND POTASSIUM FERTILIZERS

FERTILIZER	% NUTRIENT
Nitrogen Fertilizer	N
$(NH_4)_2SO_4$	21
NH_4Cl	26
$CO(NH_2)_2$	46
NH_4NO_3	33.5
Phosphate Fertilizer	P_2O_5
Superphosphate, ordinary	20-40
Double superphosphate	40-44
Triple superphosphate	46
Rock Phosphate	4-10 available
Potash Fertilizer	K_2O
Potassium chloride	60
Potassium sulfate	50

5. FERTILIZER BLENDS

Fertilizer blends are the result of combining two or more single fertilizers and mixing well with the exact quantities of each type known in one bag. You may make any blend by calculating the amounts of nutrients required for a specific crop and weighing and mixing together. Care must be taken that all fertilizers that are mixed will be compatible and no reaction will take place where they become unavailable.

The most economical method to acquire the proper mixed fertilizers is to purchase from the market. You may select any blend that is the most suitable to meet your soil and crop requirements. Remember to have your soil tested prior to applying fertilizer. If it is difficult, or impossible, to have your soil tested you must observe the plant growth during the past crops to determine future plant fertilizer needs. You should also observe the soil profile and where necessary consult with a soil specialist. You should at least know the pH of your soil as it will help you in making decisions about what to apply.

The following mixed fertilizers are available in most area markets. The amounts used per unit area may vary greatly depending on soil type.

CROP	SOIL TYPE	FERTILIZER	RATE, KG/RAI
Rice	Clayey soil	16-20-0 18-20-0 20-20-0	30-50 30-35 30-50
	Sandy soil	same above	30-50 add 4 kg K_2SO_4
		12-6-3 kg N-P_2O_5 K20 per rai* 12-15-6 kg N-P_2O_5 per rai**	
Corn	Clayey soil	16-20-0 18-20-0	40-80 40-80
	Sandy soil, loamy	16-16-8	50-80
Cassava	All type	15-15-15	50-80
Cotton	All type	15-15-15	40-80
	Calcarcous soil	12-24-12	50-80

Beans	Clayey soil	12-24-12	30-50
	Sandy soil	6-24-24 3-9-6 kg $N-P_2O_5-K_2O$*	30-50

**** Worapote Rumpaninin, et al. 1982 Suitable Rate of Fertilizers for Rice. * Agricultural Science Department, Ministry of Agriculture and Cooperatives, Thailand.**

6. SOIL p.H., ITS EFFECT ON PLANT GROWTH

If the soil solution produces hydrogen ions in larger quantities than hydroxy ions the soil reaction will be acid. The other type of soil may contain large quantities of Ca, Na, K or Mg, which prefer to form with hydroxy ions and the soil will indicate alkalinity.

The measurement of the concentration of hydrogen ions in a solution is the method of determining the pH value. With the pH value of 7 being neutral any value over 7 becomes alkaline and below 7 becomes acid.

The importance of the soil pH to normal plant growth is as follows. First one must consider which crops are capable of tolerating strong acid or strong alkaline soils. Second, which nutrients are dissolved and available to the plants at a specific pH range. Third, the dangers of toxicity from micro nutrients which are over dissolved in the soil solution while the micro nutrients are fixed. For example phosphorus is precipitated at pH below 4.5 and abvove 8.0.

7. CORRECT SOIL pH VALUES

The most desirable pH value for all crops is between 6 and 7. At the value of 6 or 7 every essential element is dissolved in the exact proportion for maximum plant growth. Lime, (calcitic or dolomitic limestone) are used to increase the pH value of acid soils and sulfur is used to decrease the pH value of alkaline soils. Soil tests should be made to verify the exact needs prior to applying any of the above mentioned materials.

SESSION TITLE: Pig Feed and Feeding

SESSION #44 WEEK #3 DAY #13 (44-3-13)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

After relating the general animal nutrition discussion to specific swine needs, this session indicates how to determine whether the pigs are growing satisfactorily with the existing feed mix. The trainees will:

- o Learn how to estimate the weight of pigs by the tape measure method.
- o Also discuss pig nutritional needs and feeding options available in the host-country.
- o Learn how to balance and mix a pig ration.

HAND-OUT:

READING ASSIGNMENT: Small-scale Pig Raising, Pgs 102-103 and 160-161.

SESSION TITLE: Introduction to Fish Farming

SESSION #45 WEEK #3 DAY #14 (45-3-14)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Crossover and Fisheries volunteers play an important role in the development of small-scale fish farming in the host-country. The need for integrated farming which includes fish, animals and crops is extremely important in assisting farmers to develop a range of activities that generate income.

The objectives of this session are:

- o To understand the basic components of small-scale fish farming. Facilities, maintenance, care, nutrition and disease control.
- o To understand the basic species of fish grown in the host country.
- o To understand the environment necessary for the production of each species and ways that fish can be integrated with livestock.
- o To be introduced to the facilities necessary for small-scale fish farming (pond, water, marketing).
- o To introduce trainees to Crossover & Fisheries volunteers to be used as future resources.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Plant Propagation

SESSION #46 WEEK #3 DAY #15 (46-3-15)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Many types of plant propagation techniques are used in tropical agricultural production and the methods most commonly used in the host-country will be detailed in this session. The trainees will learn:

- How to propagate plants of various types including tubers, cuttings, and rhizomes.
- The theory and technique of each type.
- How to identify the methods used for most plants, i.e. flowers, vegetables, herbs.
- Through hands-on experience with all of the above.

HAND-OUT:

READING ASSIGNMENTS: *Knotts Handbook for Vegetable Growers.* Pg 69.

TECHNICAL VOCABULARY:

Propagation
Cutting
Tuber
Rhizome
Kitchen garden

Plant
Nursery
Hoe
Water can
Rake

SESSION TITLE: Staking and Trellising/Maintenance

SESSION #47 WEEK #3 DAY #15 (47-3-15)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

In the tropics many crops will not grow or produce properly if not kept up off of the ground. This is especially true during the wet season when the soil surface remains wet or moist fostering fruit and vegetable spoilage during growth. Therefore, this session will demonstrate to the trainees:

- Why staking and trellising are important in the host-country.
- Which crops require staking or trellising.
- The most appropriate methods and materials used in the host-country.
- The proper timing for staking or trellising different crops.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Staking
Tying
Plastic
Bamboo

Trellising
String
Stakes
Crop names

SESSION TITLE: Basic Soils

SESSION #48 WEEK #3 DAY #16 (48-3-16)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Soils are the medium for plant growth and have a wide variety of qualities and characteristics. Therefore it is extremely important that the trainees learn and understand the following aspects of basic soils:

- o The importance of the basic soil and plant relationship.
- o How soil is formed and how it is classified by texture.
- o How to test soil pH values and
- o Their effect on plant growth.
- o The variability of soil types throughout the host-country.
- o The importance of soil conservation techniques and soil improvement methods.
- o The techniques of adding chemicals, i.e. fertilizer, lime and sulfur, and what the results will be in different areas of the host country.

HAND-OUT: #48-a Soil Texture Classifications.

READING ASSIGNMENT: - Crop Production Handbook, Pgs 2-19.

- oils, Crops and Fertilizer Use, Pgs 20-30.

TECHNICAL VOCABULARY:

Soil particles
Clay
Soil
Soil profile
Texture
Soil pH
Sand
Silt
Fertilizers
Manure
Compost
Organic matter

HAND-OUT #48-a

SOIL TEXTURE CLASSIFICATIONS

INTRODUCTION

Soils of all types and characteristics are the basis for all living plants and trees. The quality of these soils is the primary factor that determines the yield or growth of these plants and trees. The following session, basic soils, will give you an insight on how to care for, maintain and improve a wide variety of soils for higher production.

1. SOIL COMPOSITION

It is possible to sepaerate the composition of any soil. When separating, topsoil for example, you will find 4 major components as described below.

a. **Solids**, which you can see with the naked eye, such as particles of sand and gravel, but many of the particles are very small, such as ions, and must be magnified to see clearly.

b. **Organic matter**, in the topsoil of most agricultural land would be 2 percent or less by volume. In the subsoil it could be called carbon instead of organic matter.

c. **Water**, which in most cases surrounds the soil particles, except in very dry soil.

d. **Air**, since the soil contains a certain amount of particles or aggregates, there are numerous pore spaces among them that will be filled with water or air. These pore spaces vary greatly with the soil type and texture.

We will study soil solids in depth but due to the limitation of time we will only mention the other components and describe their functions. The solid phase of a soil is a mineral grain·smaller than 2 millimeters in diameter. The size from 2 to less than 0.002 millimeters are called soil particles. These particles function as an absorber of other elements such as organic matter, water and important plant nutrients. The elements or ions which we are not able to see with the naked eye can be determined by analysis with great accuracy. The fertilizers we apply to the land consist of elements that when dissolved in soil suspension ionize into ions that plants can take up as plant food.

What other roles can ions play in soil suspension besides that of plant nutrition? One may be toxic to plants if large amounts are dissolved into soil solution under certain conditions. Nutrient elements may also exist in forms of precipitated compounds which are not available to the plants.

2. INSPECTING A SOIL PROFILE

Let us dig a pit to a pre-determined depth, then examine the profile and what do we see? We find a distinct difference between the top layer, defined as topsoil, and the lower layer defined as subsoil. Most topsoil is darker in color than the subsoil because of the higher content of organic matter. This topsoil is more porous with good aeration and abundant plant food. This top layer is named the A. Horizon.

Now look over the lower profile, subsoil, and you will see that it is lighter in color and contains less plant roots and organic matter, and is therefore, less fertile. If you look deeper you may find color spots called mottling in this horizon. We differentiate soil horizons by color, texture, structure, porosity, amount of roots, chemical reaction and others. Let us now learn about soil textures.

3. SOIL PARTICLES AND TEXTURES

Soil textures are classified into three types according to the combination of particles with the particles the smallest unit of a soil. A mixture of soil particles determines the type of soil texture, with particle classification based on size.

SOIL SEPARATE	PARTICLE SIZE (mm)	SHAPE
SAND		
Very coarse sand	2 - 1	Round some angular
Coarse sand	1 - 0.5	Round some angular
Medium sand	0.5 - 0.25	Round some angular
Fine sand	0.2 - 0.1	Round
Very fine sand	0.1 - 0.05	Round
SILT	0.05 - 0.002	Round
CLAY	< 0.002	Plate like

Each soil texture consists of the above mentioned soil separates but are different according to the percentages of each component. These textures may be classified into 12 groups as indicated by the following table.

Figure # 9

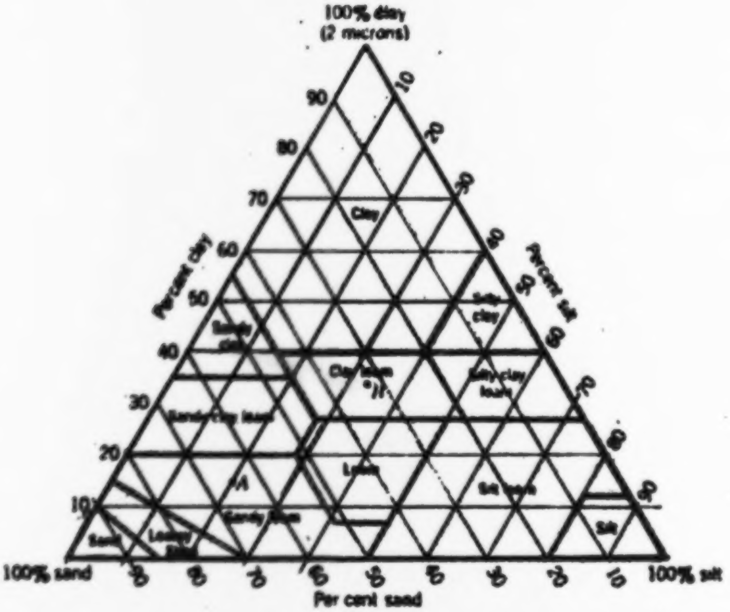

100% clay
(2 microns)
Percent clay
90
80
70
60
50
40
30
20
10
Percent silt
10
20
30
40
50
60
70
80
90
Clay
Sandy clay
Silty clay
Clay loam
Silty clay loam
Sandy clay loam
Loam
Silt loam
Sandy loam
Loamy sand
Sand
Silt
100% sand
90
80
70
60
50
40
30
20
10
100% silt
Per cent sand

Fig # 9 The textural triangle shows the limits of sand, silt, and clay contents of the various texture classes.

Different layers may vary greatly in their textures and one local texture may differ from others. We are able to examine the textures by the two following methods. First, by taking a hand full of moist soil, not too wet, and squeezing it between the fingers. As a rule of thumb you can tell what the soil texture is by this method. The second is by the sedimentation method which requires a given amount of soil and water mixed thoroughly and allowed to settle. This technique is considered an intensive investigation.

4. WHAT THE TEXTURE TELLS YOU

a. Sandy or light soil has less plant nutrients, excessive drainage, leaches fertilizers and nutrients quite readily, has low water holding capacity and does not support trees for normal growth. The only plus for sandy soil is that it is easy to till in most cases.

b. Loamy soil on the other hand is good for agriculture and if managed properly will give a high value return from most crops.

c. Clay soils have high cation absorption capacity, high water holding capacity and are high in plant nutrients. It is easier to maintain the organic matter level. Usually we find clay soils in the lowlands because in most cases it is carried by water from the higher elevations and deposited in the lower plains.

SOIL TEXTURE CLASSIFICATION

Coarse-textured soils	1 Sandy and loamy sands	Sand Loamy sand
Medium-texture soils	2 Sandy loams	Sandy loam Fine sandy loam
	3 Loamy soils	V.F. sandy loam Loam Silt loam Silt
	4 Moderately heavy soils	Sandy clay loam Clay loam Silty clay loam
Fine-texture soils	5 Clays and silty clay	Sandy clay Silty clay Clay

6. SOIL STRUCTURE

What does a clod of soil look like? They can be round, blocky, platy or prism shaped. We are talking about the shape of a soil clod (ped) and its sizes. Clods are formed by the arrangement of soil particles and the amount of moisture in the soil which when dry forms hard clods which are soil structures. The primary function of the soil structures are for holding plant roots, air, water and plant nutrients.

Plate like structures are clods when formed look like plates. The horizon width of plate clods is greater than the vertical one. The soil containing plate structures indicate poor aeration and water drainage. Some soils have blocky structures or blocky types which mean each side is equal.

7. SPHEROICAL STRUCTURES

These are the structures which form in soil containing high organic matter and would be considered loamy soils. This type of soil structure would only occur in the topsoil which is the horizon.

8. SOIL OF THAILAND

a. Soils of the Central Plains

Most of the soils in the central plan of Thailand are clayey in texture and classified as alluvial, rich in plant nutrients. Most of these soils are used for rice paddy with some being very acid with the pH value below 4.5. Therefore, the farmers must use lime (calcitic or marl) to correct the acidity problem which can also be improved through the use of organic matter along with the application of lime. It is also possible to have soils, used for field crops, that are heavy in texture but in the high pH range. (alkaline)

b. Soils of the East

The majority of the soils in the east are sandy in texture, with a few areas in the lowland high in clay texture. Some areas also have high concentrations of lateritic soils but not serious enough to affect the growth of trees. Most of these soils are used for field crops and small areas for rice production.

c. Soils of the South

The peninsular area has a wide variation in soil textures with sandy soils along the coast but higher elevations are clayey and gravelly. Good quality soils, high in organic matter are found in large areas in Narathiwat province. The low productive soils are mostly in the old mined lands.

d. Soils of the North

Soils of the northern part in the most part are of medium texture with few problems in terms of their productivity but highly susceptible to erosion.

e. Soils of the Central Highlands

Soils of the central highlands are generally speaking of fine texture and on a complex topography. Many areas are full of cobbles and large rock outcrops. However, the soils are quite productive with a high hazard of erosion.

f. Soils of the Northeast

Coarse to medium textured soils of a sandy nature are found throught the northeast. Due to the large areas of highly weatherd soils which are extremely leachable, these soils are very low in productivity. Most of these soils are medium to highly acid with considerable amounts that are very highly saline. The salinity causes tremendous problems with all types of crop production and yields are reduced. The major technique for correcting soil salinity problems is by using plenty of water to dissolve the salts. Once the salts have been dissolved, adequate drainage is necessary to remove the salts from the soil, followed by broadcasting sulfur powder. The last alternative is to grow crops and varieties that have a high tolerence to saline conditions.

SESSION TITLE: Using Chemicals and Chemical Fertilizers
Introduction to Metric III

SESSION #49 WEEK #3 DAY #16 (49-3-16)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Farmers the world over are becoming more aware of the fact that proper maintenance of their soil s fertility and structure will help reduce pest damage. In doing this the farmers grow stronger, healthier and higher producing plants with an ultimate decrease in production costs, which increases profits. This session will introduce the trainees to ways and methods:

- o That will show the benefits of using chemicals along with chemical fertilizers for maximum results.
- o Of proper fertilizer use (timing and placement) for higher yields and returns.
- o Used in the labeling and identification of elements (i.e. N-P-K).
- o Used in applying such as rates Lbs/ac or Kg/ha.
- o That local farmers use fertilizer to benefit the crop or waste money.

HAND-OUTS: #49-a The Average Composition of Fertilizer Materials.

#49-b Applying Chemical Fertilizers.

READING ASSIGNMENT: Intensive Vegetable Gardening, Pgs 39-42
and Pest Control, Pgs 141-143.
Soils, Crops and Fertilizer Use, Pgs 35-43.

TECHNICAL VOCABULARY:

Chemicals Chemical fertilizer

HAND-OUT #49-a

AVERAGE COMPOSITION OF FERTILIZER MATERIALS

Fertilizer Materials	Chemical Formula	Total N%	Available P_2O_5 %	Combined Ca%	Combined S%
Ammonium Nitrate	NH_4NO_3	34			
Ammonium Nitrate-Sulfate	$NH_4NO_3 . (NH_4)_2SO_4$	30			6.5
Monoammonium Phosphate	$NH_4H_2PO_4$	11	48		
Ammonium Phosphate Sulfate	$NH_4H_2PO_4 . (NH_4)_2SO_4$	13	39		7
Ammonium Phosphate-Nitrate	$NH_4H_2PO_4 . NH_4NO_3$	27	12		4.5
Diammonium Phosphate	$(NH_4)_2HPO_4$	16-18	46-48		
Ammonium Sulfate	$(NH_4)_2SO_4$	21			24
Anhydrous Ammonia	NH_3	82			
Aqua Ammonia	NH_4OH	20			
Calcium Ammonium Nitrate Solution	$Ca(NO_3)_2 . NH_4NO_3$	17		8.8	
Calcium Nitrate	$Ca(NO_3)_2$	15.5		21	
Calcium Cyanamide	$CaCN_2$	20-22		37	
Sodium nitrate	$NaNO_3$	16			
Urea	$CO(NH_2)_2$	38			

HAND-OUT #49-a (continued)

AVERAGE COMPOSITION OF FERTILIZER MATERIALS

Fertilizer Materials	Chemical Formulas	Total N%	Available P_2O_5%	Combined Ca%	Combined S%
Urea ammonium nitrate solution	$NH_4NO_3.CO(NH_2)_2$	32			
Single Superphosphate	$Ca(H_2PO_4)_2$		18-20	18-21	12
Triple Superphosphate	$Ca(H_2PO_4)_2$		45-46	12-14	1
Phosphoric Acid	H_3PO_4		52-54		
Potassium Nitrate	KNO_3	13			
Potassium Sulfate	K_2SO_4				18
Sulfate of Potash-Magnesia	$K_2SO_4.2MgSO_4$			0.1	22

HAND-OUT #49-b

APPLYING CHEMICAL FERTILIZERS

Recommendations for fertilizer blends in Thailand would be consistent throughout the country. 15-15-15 at the rate of 50 Kg/rai (275 Lbs/ac) will act as a starter fertilizer and in most cases supply all the P and K necessary for maximum yield. The only addition to some crops such as corn, rice and some leaf vegetables would be 50 Kg/rai (275 Kg/ac) of ammonium sulfate.

The following calibrations are based on the grams per linear meter at different row spacings.

15 cm (small vegetables)	5 gms	one level teaspoon
30 cm (med vegetables)	9 gms	two level teaspoons
50 cm (field crops)	16 gms	three level teaspoons
60 cm (green beans)	19 gms	four level teaspoons
Broadcast = 31 gms/sq m		six level teaspoons

SESSION TITLE: L.S.S. School Field Trip

SESSION #50 WEEK #3 DAY #16 (50-3-16)

PRESENTER:

CO-FACILITATOR:

TIME: 13:00-17:00 F

The Session Design for this Program Specific Session is in Appendix A.

SESSION TITLE: Insect Identification

SESSION #51 WEEK #3 DAY #17 (51-3-17)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

The use of pesticide in the host-country is poorly controlled and therefore is used indiscriminately without regard to plant, animal or human safety. Alternate methods are overlooked and could be used in place of pesticide in many cases, if the farmers could identify their problems and plan for proper insect control. The trainees can contribute to providing this information at their sites. It is thus important that they can:

- Identify the most common types of insects in the host-country and the damage caused by each type.
- Understand the life cycle of these pests to assist in an insect monitoring program.
- Have hands-on experience in the field to observe the actual insects and the damage done by each.
- Know the basics of how the different types (chewing and sucking) are controlled.

HAND-OUTS: #51-a Insect Identification
#51-b Insect Life Cycles

READING ASSIGNMENT: Crop Production Handbook, Pgs 66-78.

TECHNICAL VOCABULARY:

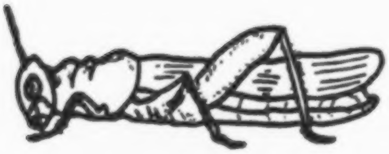
Names of insects found or studied.

Chew	Such
Life cycle	Damage
To fly	To jump
Beneficial insects	

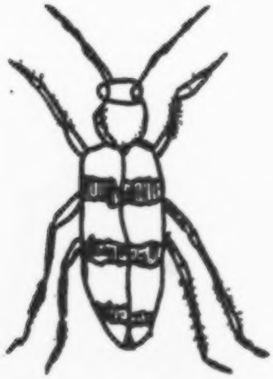
HAND-OUT #51-a

INSECT IDENTIFICATION

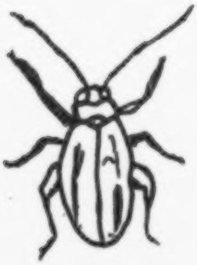
FIGURE # 10 CHEWING INSECTS



1. ตั๊กแตนหนวดสั้น GRASSHOPPER



2. ด้วงน้ำมัน BLISTER BEETLE

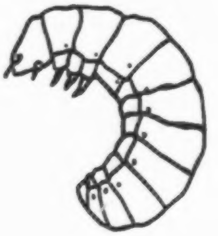


3. ด้วงหมัดผัก FLEA BEETLE

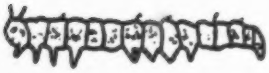
GANOK URAISAKUL

HAND-OUT #51-a (CONTINUED)

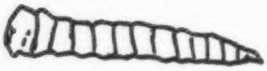
FIGURE # 11 CHEWING INSECTS (CONTINUED)



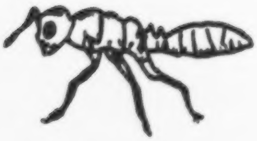
4. ตัวอ่อนด้วง BEETLE LARVA



5. หนอนผีเสื้อ CATERPILLAR



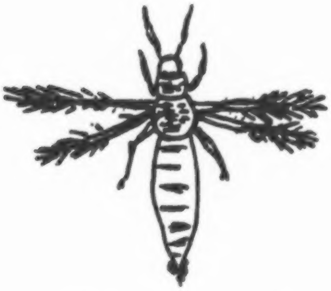
6. หนอนแมลงวัน MELONFLY WORM



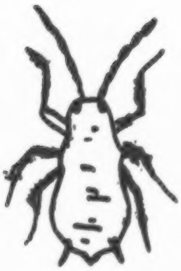
7. เสี้ยนดิน SUBTERRANEAN ANT

HAND-OUT #51-a (CONTINUED)

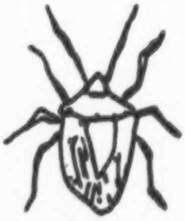
FIGURE # 12 SUCKING INSECTS



8. เพลี้ยไฟ THRIP



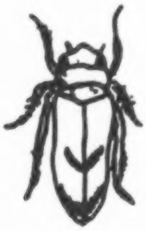
9. เพลี้ยอ่อน APHID



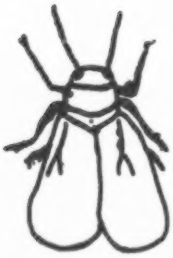
10. มวนเขียว GREEN BUG

HAND-OUT #51-a (CONTINUED)

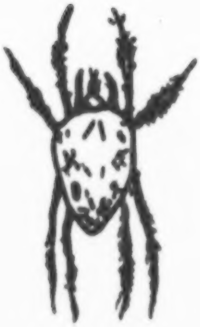
FIGURE # 13 SUCKING INSECTS (CONTINUED)



11. เพลี้ยจักจั่น LEAF HOPPER



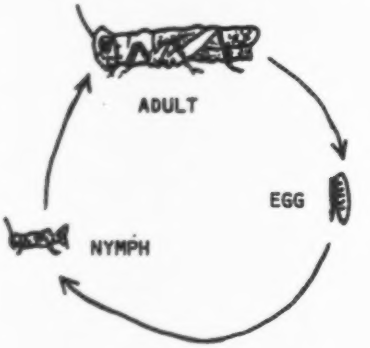
12. แมลงหวี่ขาว WHITE FLY



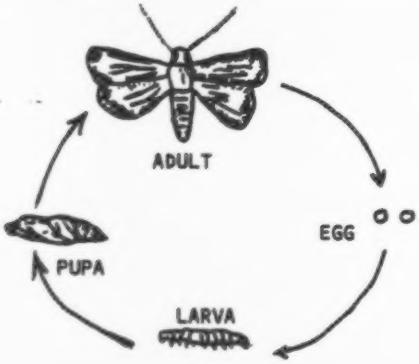
13. ไรแมงมุมแดง RED SPIDER MITE

HAND-OUT #51-b

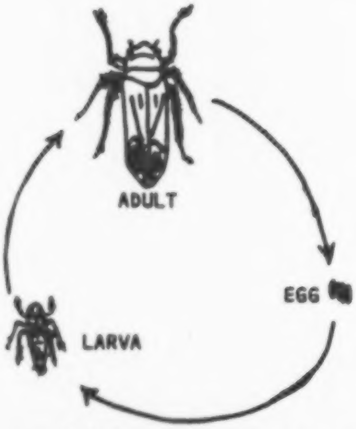
FIGURE # 14 INSECT LIFE CYCLES


ADULT
EGG
NYMPH

14. ชีพจักรของตั๊กแตน GRASSHOPPER LIFE CYCLE


ADULT
EGG
LARVA
PUPA

15. ชีพจักรของหนอนกระทู้ฝักข้าวโพด CORN EARWARM LIFE CYCLE


ADULT
EGG
LARVA

16. ชีพจักรของเพลี้ยจักจั่น LEAF HOPPER LIFE CYCLE

SESSION TITLE: Mushroom Production

SESSION #52 WEEK #3 DAY #17 (52-3-17)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Mushrooms are grown throughout the host-country using many different techniques. They are a cheap source of protein and can be produced on a small scale in home gardens. The objectives of this session are to demonstrate the many techniques for growing mushrooms with hands-on experience that will give the trainees confidence to develop mushroom projects at their sites. They will understand the following at the end of training:

- Nutritional values of mushrooms.
- Materials required for production of each type.
- The basic cost of production.
- Marketing, supply and demand. When and how to harvest.

HAND-OUT: #52-a How to grow rice straw mushrooms.

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Rice straw
Mycilium
Soak

Sprinkle
Mold
Spawn

Mushroom
Edge
Kapok

HAND-OUT #52-a

HOW TO GROW RICE STRAW MUSHROOMS (VOLRARIELLA VOLRACEA)

A. MATERIALS

1. Rice straw, preferably the part left in the field after harvest. Pull it out with the roots included. The threshed ears are minor quality and give poorer results. Other substrates can be used: sorghum and wheat straw, maize residues baggasse, banana leaf, tobacco stems, water hyacinth, sawdust, cotton and kapok wastes.

2. Manure: dry cattle manure, possibly mixed up with dry chicken or pig manure at rates of 2:1 to 3:1.

3. Spawn: different qualities, check with experienced growers. Price: 3 baht per bag.

4. Water: don't use saline, alkaline or acid water.

5. Container to soak the straw: water pond, oil barrel, according to possibilities.

6. Plastic sheet 1 roll 100-115 baht about 60 m. If you buy per meter: 3 baht/m.

7. Wooden mold: L 80-150 cm
   W 30-40 cm the bottom part should be wider than the top.
   H 30 cm

8. Watering can.

B. METHOD

1. Inoculation

   - Soaok the straw (10 min - 1 night).

   - Loosen the soil and water.

   - Place the wooden mold on the plot (if necessary use a rope for linming up the beds).

   - Put in the first layer of straw, not more than 4 cm. Try to put the roots at the outside. Tread with bare feet until dense, especially at the 4 sides, and water.

   - Mix the dry manure with water and put it on the straw along the 4 sides, 1 to 2 cm thick, about 5 cm wide.

- Take the mushroom spores, previously divided into 3 equal parts (1 part for each of the 3 layers) and press it gently into the manure, as close to the wooden mould as possible. Water.
- Put in the straw for the second layer, about 6-8 cm, and repeat same procedure.
- Identical for the 3rd layer. Add a thick layer (= 10 cm) of straw on top. Tread and water.
- Remove the wooden mold by pushing on the straw and pulling up the mold on both sides.
- Repeat this procedure for as many beds as you want (10 is a practical number). Leave about 1 hoe width between the beds.
- Straw manure on the soil between and around the bed.
- Cover with two plastic sheets, with or without wooden support. Fix it with earth, stones, wood, whatever.
- Cover with dry straw.
- Protect from chicken (if necessary) by putting bamboo branches or roof patches on top of it.

2. Follow up

The first 4 to 5 days, the spore is running (35-40 degree C). Be sure the temperature is high enough.

The fruiting period starts at the pinhead stage (opt 30-35 degree C). Follow up temperature and humidity. If necessary, water around (not on!) the bed, and open the plastic 5 to 10 minutes per day, in the morning or the evening, or open the plastic two fingers, day and night.

3. Harvest

Pick the mushrooms (after 9 to 10 days, depending on the season) by turning them around. Be sure not to leave the foot in the bed. It will cause rotting.

Pick before the head emerges completely. Market price for full grown heads drops about 50%.

You should be able to harvest at least 1 kg per bed.

4. Ratooning

After 2 to 4 days, all the mushrooms will be picked. Pour plain water, or water enriched with manure or urea on top of the beds, cover up again with plastic and straw, and after 3 to 6 days a ratooning harvest will be possible (fewer and smaller mushrooms).

The remaining straw is excellent for composting.

5. Seasonal variations

Temperature and humidity vary strongly according to the season. The inoculation and following procedure will vary correspondingly.

VARIABLE	COOL SEASON	HOT SEASON
1. Time for soaking straw	30 min	10 min
2. Number of layers	3	3 or 2
3. Thickness of top layer	10 cm	10 cm
4. Watering	not too much	abundantly
5. Distance between beds	closer	wider
6. Ventilation	seldom	always

Very seldom mushrooms are grown in the rainy season because:

- No straw is left since all the paddy fields are under cultivation.
- The farmers spend all their time growing rice.

Since the supply is not meeting the demand, price are booming (up to 50 baht/kg, where as an average hot season price is 20 baht/kg).

Convincing farmers to stock their straw for mushroom production in the rice growing season would provide them with an excellent extra income.

Be sure however that spore is locally available then.

SESSION TITLE: Field Trip: Integrated Farm

SESSION #53 WEEK #3 DAY #18 (53-3-18)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

The purpose of this field trip--to visit an integrated farm and a commercial flower and ornamental plant farm--is twofold. First, it gives trainees a break from the rigorous training schedule while still serving as an agriculture-related training session. Trainees also benefit from seeing new parts of the host-country. A trip of this nature broadens their perspectives concerning agriculture in the host-country and allows them:

- To better understand the benefits of integrated farming.
- To improve their knowledge of different techniques used for producing vegetables.
- To understand the improved ways of producing ornamental plants.
- To see new technology for flower production and propagation.
- To see high technology in irrigation systems i.e. mist box for nursery propagation.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Integrated farm
Chickens
Fish
Vegetables
Fruit trees
Mist box

Manure
Flowers
Cut flowers
Potted plants
Ornamental plants

Week #4

54	4	19	Insect Control	08:00-10:00	F/C
55	4	19	Record Keeping Review/ Marketing	10:00-11:00	F/C
56	4	19	Planting Situations	11:00-12:00	C
-	-	-	L/CC/Dev	13:30-16:30	-
57	4	20	Plant Disease and Control	08:00-09:30	F/C
58	4	20	Maintenance	09:30-11:00	F
59	4	20	Quiz II	11:00-12:00	C
-	-	-	L/CC	13:30-16:30	-
60	4	21	Fruit Tree Propagation	0:800-11:00	F/C
61	4	21	Introduction to Marketing (Animals)	11:00-12:00	C
62	4	21	Plot Evaluations	13:30-14:30	F
-	-	-	L/CC	14:30-16:30	-
63	4	22	Mixing & Applying Pesticides	08:00-10:00	F/C
64	4	22	Chicken Records Analysis	10:00-11:00	C
65	4	22	Program Manager II	11:00-12:00	C
-	-	-	L/CC	13:30-16:30	-
66	4	23	Swine Management Skills	08:00-10:00	F/C
67	4	23	Fertilizer Math and Introduction to Metric #4	10:00-11:00	C
68	4	23	Maintenance	11:00-12:00	F
-	-	-	L/CC	13:30-16:30	-
69	4	24	Soil Conservation	08:00-10:00	F/C
-	-	-	L/CC/Dev	10:00-12:00	-

SESSION TITLE: Insect Control

SESSION #54 WEEK #4 DAY 19 (54-4-19)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Insects, in the tropics, can/do have a tremendous effect on the production of most crops. The use of chemicals for insect control is important but, unfortunately in the host-country, their application is generally haphazard. Therefore this session will assist the trainees:

- o In understanding integrated pest management and its major concepts.
- o In understanding control measures appropriate to host-country conditions at volunteer sites.
- o In learning how to build and use several types of insect traps for monitoring populations.

HAND-OUTS:

#54-a	The Principles of Insect Control
#54-b	Introduction to Insects and Insect Control
#54-c	Organic Pest Controls

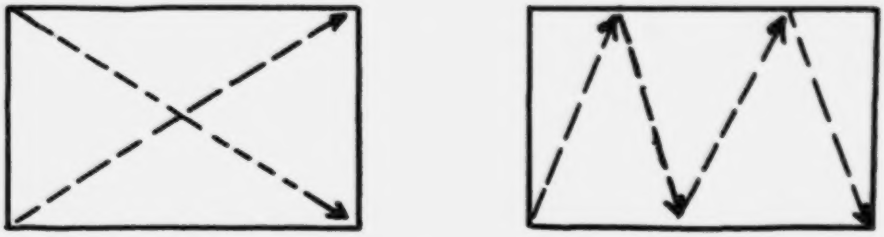
READING ASSIGNMENT: Traditional Field Crops

HAND-OUT #54-a

THE PRINCIPLES OF INSECT CONTROL

1. Correctly identify the pest:
    a. Does the insect match the damage?
    b. Is there more than one pest causing the damage.
    c. Was the insect caught "red handed"?
2. Assess the economic importance of the pest:
    a. What losses in yield, quality and marketability result from the damage?
    b. Will the pest infest other crops, present or future?
    c. Will the pest spread disease?
3. Survey the insect pest (quantitative and qualitative):
    a. How many pests are in our field or plot?
    b. What type of pest is present? (species)
    c. What's the damage level?

    How to survey:



    Survey on the diagonal to cover more ground and all the areas of plot.

4. Choose the appropriate method(s) of control while you are in the field, and decide how you'll put them into action.
5. Study the ecology of your plot area to see how it affects the insect population. Beware of anything that would upset the ecological balance. However, planting your crop may have upset things already. Study the ecology both before and after introducing a control measure.

6. Study the biological details of the insect pest. Bring specimens home and watch them closely.

   a. Morphology;
   b. Life history and life cycle;
   c. Alternative hosts (weeds, other crops);
   d. Nature of the outbreak and what triggered it;
   e. Parasites and predators.

7. Know the growth and development of economic plants (your crop), so that you can see how pests are interfering with your goals of good crop growth and good yields.

METHODS OF INSECT CONTROL

I. NATURAL CONTROL

   A. Abiotic factors (physical factors)

      1) Weather factors

         a) drought/flooding
         b) temperature
         c) rainfall
         d) weather patterns

      2) Geographic barriers

         a) lakes
         b) mountains
         c) deserts
         d) oceans

   B. Biotic factors

      1) predators

      2) parasites

      3) disease

II. APPLIED CONTROL

A. Biological Control: The mass rearing of predators, parasites and pathogens which are then released in the affected crop area.

1) Bacillus thuringiensis (trade name: Argona) is a spore forming bacteria.

2) Trichogramma sp. can be mass reared on the egg of the rice moth (Coreyra cephalonica).

3) Praying mantis nymphs: find a cocoon and keep at home until the nymphs hatch out.

B. Mechanical Control: Equipment is used to control the pest.

1) Hand picking: an often overlooked way to control pests;

2) Nets;

3) Cover the crop (usually fruit) with wax paper, bags, or cloth;

4) Traps: stickly, water, bait;

5) Flooding;

C) Physical Control: Electrical equipment or some form of energy is used in these methods.

1) Light traps;
2) Sound-some frequencies repel mosquitos;
3) Heat;
4) Boiling water.

D) Cultural Controls: Develop the crop environment so that it isn't conductive to insect growth.

1) Crop rotation
2) Intercropping
3) Burying crop residues
4) Timing the crop calendar
5) Sanitation

E) Resistant Varieties: This has been accomplished, to some degree for rice, but not for other crops, especially vegetables. In short, this method of control is not available for you in Thailand.

F) Genetic Control: Growing a weak or sterile variety of a pest to mate with natural pests. This can be done by selection or by induced mutations from chemicals and radioactive agents. This is probably beyond your means, also.

G) Chemical Control: The farmers first choice, but it should be your last. Consider other methods first.

  1) Inorganic insecticides;

  2) Synthetic insecticides (petroleum derived),

  3) Botanical insecticides (plant derived).

  4) Hormones: usually hormone analogs that are synthesized in the laboratory.

H) Organic Control: These don't harm the environment and are sometimes quite effective. Best of all, they don't leave nasty things in our food. However, don't depend on them.

I) Grow Another Crop: Consider the value, both economic and nutritional, of the crop and compare it with the costs in time, labor, safety and money of controlling the pest that is destroying that specific crop. Don't fight nature. Work within nature's limits.

HAND-OUT #54-b

INTRODUCTION TO INSECTS AND INSECT CONTROL

I. SOME IMPORTANT FACTS ON INSECTS

How Insects Damage Plants

Insects can often be identified by the type of damage they cause:

1. Chewing and boring insects

   a. Caterpillars are larvae of moths. They damage plants by feeding on leaves and making holes in them or by boring into stalks, pods, and maize ears. The cutworm caterpillar is unusual in that it lives in the soil and emerges at night to cut off plant stems near ground level.

   b. Beetles feed on plant leaves and chew holes in them; some beetles of the weevil family bore into pods and seeds and deposit eggs inside. Certain beetles can also transmit bacterial and viral diseases.

   c. Most beetle larvae like white grubs, wireworms, and rootworms live in the soil and damage roots and the underground portion of the stem by chewing or boring. A few bettle larvae such as those of the Mexican bean beetle and Colorado potato beetle live above ground and feed on leaves.

2. Sucking insects

   Aphids, leafhoppers, stinkbugs, harlequin bugs, whiteflies, and mites have piercing and sucking mouthparts and feed on plant sap from leaves, pods, and stems. They transmit a number of plant diseases, especially viruses. Sucking insects do not make holes in the leaves but usually cause leaf yellowing, curling, or crinkling.

Insect Life Cycles

A general understanding of insect life cycles will also help you identify insect problems in the field. Beetles and moths go through a complete metamorphosis (changes in form) of 4 stages, while aphids, leafchoppers, white-flies and other sucking insects go through only 3 stages.

```
(Adult stage)                         (Larva)
   MOTH--------> EGG--------> CATERPILLAR--------> PUPA
(Does no damage)        (Usually feeds on leaves)  (Dormant stage;
                                                    turns into a
                                                    month)

(Adult stage)
  BEETLE------> EGG--------> LARVA---------------> PUPA
(Feeds on                 (Grubs, wireworms,       (Dormant stage;
 leaves, pods)             rootworms, etc.          turns into a
                           feed on plants roots)    beetle)

(Adult stage)
APHIDS, LEAFHOPPERS,--------> EGG-----------------> NYMPH
STINKBUGS, WHITEFLIES,                             (Look like a
OTHER SUCKING INSECTS                               miniature
                                                    adult; sucks
                                                    sap also; turns
                                                    into the adult
                                                    stage)
```

II. HOW TO IDENTIFY INSECTS AND THEIR DAMAGE

1. Be Observant: Troubleshooting takes practice, but a sharp eye is essential. When walking through a field, closely examine the plants for insects or their damage symptoms. Check both sides of the leaves since many insects prefer the undersides of leaves. A magnifying glass can be very helpful.

2. Identifying Insect Damage: Very often you'll be able to identify insects by the damage they cause.

    a. **Holes in leaves:** Caterpillars, beetles, crickets, snails, and slugs; snails and slugs aren't insects but do attack plant foliage (look for slime trails on leaves). Caterpillars leave green or brown sawdust-like excrement.

b. Wilting: Soil insects like white grubs and wireworms if root feeding or tunneling of the underground portion of the stem has been serious; stem borers. Remember that wilting can be caused by other factors too: dry soil, very high temperatures, root rots, bacterial and fungal wilts, and nematodes.

   1) Dig up the affected plants and check the root system and underground portion of the stem for insect and disease damage; look for soil insects.

   2) Slit the stem lengthwise with a pocket knife and check for borers or rotted tissue.

c. Leaf Curling, Crinkling, or Yellowing: Sucking insects, especially aphids, leafhoppers, and mites. Viruses and some nutrient deficiences also produce these symptoms. Nematodes and poor drainage cause yellowing too.

3. Identifying Insects:

Spend time with locally experienced extension workers in the field and have them point out the prevalent crop insect pests (and beneficial predator insects) in your work area. Seek out host-country or regional insect guides such as extension bulletins.

III. THE USE OF SCIENTIFIC NAMES FOR INSECTS

Each insect is known by many different local names throughout the world, which can make proper identification confusing. Fortunately, all insects (as well as plants, animals, and diseases) are assigned standardized scientific names derived from Latin.

Example: The corn earworm has been given the scientific names of Heliothis zea. The first word of the two part name refers to the insect's genus and the second part to its species.

Host-country agronomists and extension workers may often refer to insects using their genus such as "heliothis". Farmers will usually use local names for insects. Since this genus-species is being continually revised, an insect may have more than one commonly used scientific name; for example, the fall armyworm has had its scientific name changed from Laphygma frugiperda to Spodoptera frugiperda. When referring to several insects of different species that are all within the same genus, publications will often place the abbreviation "spp." after the genus.

Thus, Heliothis spp. refers to several types of heliothis caterpillars.

IV. METHODS OF INSECT CONTROL AND THEIR EFFECTIVENESS

Let's compare the effectiveness of non-chemical, chemical, and integrated insect control methods:

NON-CHEMICAL METHODS

Natural Balance

Many natural controls act to keep insects in balance:

1. Weather factors like temperature and rainfall can restrict the distribution of an insect species; for example, mites and leafhoppers are usually more prevalent under dry conditions.
2. Geographic barriers like large bodies of water, mountains, and deserts can also limit insect distribution.
3. Frogs, toads, lizards, moles, and birds are some of the many animals that feed largely on insects.
4. Beneficial predator insects like lady bugs feed on aphids, while others like the braconid wasp and tachinid fly lay eggs on or in certain pests which are killed by the developing larvae. Some predator insects like praying mantis also eat beneficial insects as well, however.
5. Insects are also attacked by viruses, fungi, and bacteria which help keep populations down.

As agricultural activities have increased, many of these natural balances have been upset and can no longer be relied upon to keep harmful insects under control. Monoculture and the existence of vast areas under cropping have led to marked increases in a number of insect pests. Many of the traditional crop varieties, despite their lower productivity, have better insect resistance than some of the improved varieties. Indiscriminate use of pesticides has also resulted in an actual buildup of harmful insects in some cases.

BIOLOGICAL CONTROL

Biological control is the purposeful introduction of predators, parasites, or diseases to combat a harmful insect species. About 120 different insects have been partially or completely controlled by this method in various parts of the world. Microbial insecticides such as Bacillus thuringiensis (effective against a few types of caterpillars) are now commonly used by farmers and gardeners in many areas. Unfortunately, biological control measures are presently effective against a very small portion of harmful insect species.

CULTURAL CONTROLS

Cultural controls such as crop rotation, intercropping, burying crop residues, timing the crop calendar to avoid certain insects, and controlling weeds and natural vegetation that harbor insects are all effective control methods for some insects. In most cases, however, cultural controls need to be supplemented by other methods.

VARIETAL RESISTANCE

Crop varieties vary considerably in their resistance to certain insects. For example, maize varieties whose ears have long, tight husks show good resistance to earworms and weevils; CIAT found that some bean varieties were relatively unaffected by leafhopper damage during the wet season, while others suffered yield lossed up to 40%. Screening for insect resistance is an important part of crop breeding programs.

"ORGANIC" CONTROLS

"Organic" control refers to non-chemical methods in general, including the application of homemade "natural" sprays made from garlic, pepper, onions, soap, salt, etc., and the use of materials like beer to kill slugs and wood ashes to deter cutworms and other insects. Some of these "alternative" insecticides are slightly to fairly effective on small areas like home gardens and where insect populations are relatively low. They are seldom feasible or effective on larger plots, especially under tropical conditions that favor insect buildup.

CHEMICAL CONTROL

Chemical control refers to the use of commercial insecticides in the form of sprays, dusts, granules, baits, fumigants, and seed treatments. While some of these insecticides like Bacillus thuringiensis, rotenone, and pyrethrin are naturally derived, most are synthetic organic compounds that have been developed through research.

ADVANTAGES OF INSECTICIDES

1. Rapid action.
2. They are the only practical means of control once an insect reaches the economic threshold of damage on a commercial size plot.
3. Insecticides are available in a wide range of properties, species effectiveness, and application methods.
4. They are relatively inexpensive, and their proper usage can often return $4-$5 for every $1 spent.

DISADVANTAGES OF INSECTICIDES

1. Insect resistance to pesticides is a growing problem. In 1961, about 60-70 species had developed resistance to certain products, and the number had increased to around 200 by the mid-1970's.
2. Outbreaks of secondary pests: Few insecticides kill all types of insects, and some actually promote the increase of certain pests. For example, continual use of Sevin (carbaryl) in the same field may increase problems with some types of aphids which it doesn't control well.
3. Damage to non-target species such as beneficial predators, bees, and wildlife.
4. Residue hazards: Some chlorinated hydrocarbon compounds like DDT, Aldrin, Endrin, Dieldrin, and Heptachlor are highly persistent in the environment and may accumulate in the fatty tissues of wildlife, livestock, and humans. It's important to realize that many other insecticides are broken down into harmless compounds fairly rapidly.
5. Immediate toxicity: Some insecticides are extremely toxic in small amounts to humans and animals. Again, it's important to realize that insecticides vary greatly in their toxicity.

CURRENT STATUS OF INSECTICIDE USE

At the present time and for the immediate future, insecticide usage will often be an essential part of any package of improved practices for the reference crops. For this reason, we urge all agricultural field workers to learn the basic principles of safe and effective insecticide application. Even though you may be personally opposed to these chemicals, you should realize that farmers throughout the LDC's are using them, often in an unsafe and indiscriminate manner. Most of these countries have few, if any, pesticide regulations or restrictions on environmentally harmful products like Aldrin or highly toxic ones like Parathion. By instructing farmers in safety precautions and in the appropriate choice and use of insecticides, the incidence of human poisoning and possible environmental damage can be greatly reduced.

INTEGRATED PEST CONTROL

The disadvantages of total reliance on insecticides have given rise to integrated pest control or pest management which involves the judicious use of these chemicals based on the following guidelines and principles:

1. The development and use of cultural and other non-chemical control methods to avoid or reduce insect problems.

2. (Economic threshold) Determining crop tolerance to pest damage based on the principle that complete freedom from pests is seldom necessary for high yields. Nearly all plants can tolerate a surprising amount of leaf loss before yields are seriously affected.

3. The appropriate timing and frequency of treatments to replace routine, preventative spraying. Treatments are not initiated before the particular insect has reached the economic damage threshold which will vary considerably with the species. Insect scouting and population counts are an essential part of this system.

The advent of integrated pest control dates back to the early 1970's, and much of the efforts have been directed at cotton where insecticides frequently account for up to 80% of total production costs. Some remarkable successes have been achieved with other crops as well. In terms of the reference crops, integrated pest control is still in the very early stage, especially in the LDC's.

HAND-OUT #54-c

SOME "ORGANIC" (NON-CHEMICAL) PEST CONTROLS

CUTWORMS:

Place a collar made of cardboard or a paper cup around the stem so that it extends from about 2 cm below the soil surface to about 5 cm above ground. Don't place the collar deeper or you may restrict the root system of the transplant. Wrapping the stem with several layers of newspaper or a couple layers of tin foil works great too. So do small juice cans or beer cans cut down to the right size.

SLUGS & SNAILS:

Stale beer (or water and yeast) placed in shallow pans in the garden is very effective at attracting and drowning the critters. However, if the container is placed on top of the mulch, slugs are unlikely to reach it. Other remedies are:

1. Place a wide board on the ground in the late afternoon. By next morning, lots of slugs and snails can be found under it; crush them.

2. Sprinkling coarse sand, wood ashes, lime, or diatomaceous earth around the plants' base will repel them. (Caution: too much lime may raise the pH too much).

3. If using mulch, keep it several inches away from the plant rows: slugs like to hide and feed under it.

4. Keep the field clean of weeds and debris.

ANTS:

Pouring boiling water over nests is very effective for fire ants. Steamed bone meal supposedly repels ants (don't try making your own bone meal out of old cattle bones; they can harbor dangerous anthrax disease).

NEMATODES:

1. Crop rotation: Sometimes difficult or impractical since most types of nematodes have many crop hosts

2. Resistant crop varieties: Varieties of a crop will vary in their resistance, and some (i.e. Roma FSN and Better Boy VFN tomatoes, Nemagold sweet potatoes, and others) are good enough to rate the name "nematode resistant variety". Check out what's available in your host-country.

3. Plowing up roots of nematode infested crops right after harvest will expose them to sunlight and drying, which will kill many of the nematodes; however, many are likely to be left in the soil itself.

4. Flooding: One month of flooding followed by a month of drying and a further month of flooding will greatly reduce nematode problems but is seldom practical.

5. Antagonistic plants: Many organic garden books suggest interplanting marigolds among susceptible crops to control nematodes. Unfortunately, research has shown that marigold species vary in their types of nematodes (root knot, root lesion). Furthermore, nematodes aren't killed by marigolds but only repelled or starved out. This means that interplanting marigolds among susceptible crops isn't effective, since the nematodes still have a food source. You would need to plant marigolds solidly and exclusively for a few months.

   Two legume green manure or cover crops, Crotalaria spectabilis (showy crotalaria or rattlebox) and Indigofera hirsuta (hairy indigo) can reduce populations of most types of nematodes. Showy crotalaria is poisonous to livestock.

6. Good soil fertility and high organic matter levels help somewhat.

7. Sugar: 8 kg of sugar/sq. meter worked into the top 15 cm of soil is said to control root knot nematodes; this may be worth a try if you're in a low cost sugar area.

COCKROACHES:

1 lb. boric acid crystals mixed with 1 can of condensed milk (the thick, sugary stuff). Make pea size pellets out of this, place on pieces of tin foil and use one per room. Will keep a year under refrigeration. Results vary from mediocre to fairly good.

BIRDS:

Soaking large seeds like maize in turpentine before planting may be a fair repellant to seed eating birds. An effective method for vegetable gardens and larger plots is continuous string flagging which uses cloth or plastic streamers 5-6 cm wide and 50-60 cm long. The streamers are attached at 1.5 meter intervals to string twine which is strung along heavy stakes at least 1.2 m tall which are spaced about 15 m apart.

ANOTHER CUTWORM REMEDY:

Tie wild or cultivated onion stems around the stems of susceptible plants at the soil surface.

CORN EARWORM:

Inject 1/4 of a medicine dropper's worth of mineral oil into the tip of each corn ear; begin as soon as silks appear and repeat every 3 days until silks begin to brown.

HAND PICKING:

Very feasible for small areas and larger insects like beetles and caterpillars.

INTERPLANTING GARLIC AND ONIONS
AMONG OTHER CROPS TO REPEL INSECTS:

Gives poor to sometimes fair control of some insects, but don't rely on it under high insect pressure.

BENEFICIAL PREDATOR INSECTS:

Lady bugs, lace wing bugs, tachnid flies, braconid wasps, praying mantids are among the more common. Where they occur naturally, they can make a big contribution. Trying to introduce them is seldom effective, since they tend to disperse.

BIOLOGICAL INSECTICIDES:

1. Bacillus thruingiensis (Dipel, Thuricide, Biotrol): Made from a natural bacteria that kills many types of caterpillars such as cabbageworms, earworms, armyworms, and hornworms. Non-toxic to humans and animals. Slow acting--insects don't die immediately but stop feeding within a few hours; apply while they're still young for best results.

2. Bacillus popillae: Causes milky spore disease in Japanese beetle grubs and some other beetle grubs when applied to the soil.

HOMEMADE ORGANIC SPRAYS

All of them except nicotine spray (which isn't really "organic") will only repel some types of insects to varying degrees and may need daily application.

Bug Juice Spray:

You need a strong stomach for this one, and it's of fickle effectiveness. Collect up to half a cup of a bad guy insect like cabbage loopers, stinkbugs, etc. Add 2 cups of water, place in a blender, and whiz it up. Organic gardening says this solution can be diluted up to 1:25,000 but that sounds like a misprint! Try it 1:5 or 1:10 for starters. Use it within an hour or two or freeze it to prevent possible contamination by Salmonella bacteria (food poisoning). Clean your blender well. In some cases, bug juice actually attracts insects; cutworm juice is known to attract cutworms. Some success has been reported with aphids, cabbage loopers, and stinkbugs plus a few more. Don't use flies, ticks, fleas, or mosquitos since they may harbor diseases or parasites.

Plant Juice Spray:

Find a non-poisonous weed or plant leaf unbothered by insects; choose smooth leaf plants, not hairy ones, and then dilute no more than 5 fold with water. Wormwood is said to kill slugs, crickets, and aphids.

Hot Pepper Spray:

Grind hot pepper pods and mix with an equal amount of water. Add a little soap powder. Try it at a 1:20-1:30 dilution with water. Be sure to strain it well before putting it in the sprayer tank.

Garlic-Pepper-Soap Spray:

4 crushed garlic cloves, 4 tablespoons hot pepper, one cake of strong soap, one cup of hot water. Strain and dissolve in 2-4 gallons warm water. Use as a general purpose spray. Results are variable.

Citrus and Banana Peel Spray:

Let banana and citrus peels soak in a pail for several days. Spray the mixture on plants and place the spent peels at their base.

Milk Spray:

Using milk full strength is deadly to many bugs but what a waste of protein! By the way, it's been shown that dipping one's hands periodically in milk or a powdered milk solution when transplanting tomatoes can significantly cut down the spread of mosaic virus by contact from plant to plant.

Salt Spray:

A tablespoon in 2 gallons of water supposedly gives fair to good control of cabbage worms; 2 tablespoons/gallon supposedly controls spider mites but test a plant or two for leaf burn first with the spray.

Molasses Spray:

Diluted 1:50 with water and used as a general purpose spray. Sounds doubtful.

Vegetable Oil:

Apply with a sprayer; may kill insects by plugging up their pores.

Soap Spray:

For soft bodied insects like aphids, thrips, whiteflies, mites, but not leafhoppers. Vegetable or plant derived soaps are better for this than petroleum derived ones.

Nicotine Extract:

For sucking insects like aphids, leafhoppers, whiteflies, thrips, and spider mites along with many other non-suckers. Most effective during warm weather. Soak 1-2 cheap shredded cigars overnight in 1 gallon water. Strain and add one teaspoon of household detergent.

> CAUTION: Nicotine is poisonous to humans and animals; it can be absorbed through the skin in harmful amounts. It can also spread tobacco mosaic virus to tomatoes, peppers, eggplant, and potatoes.

MISCELLANEOUS

Flour:

Sprinkle on cabbage plants in early morning when dew is heavy. Supposedly controls cabbageworms and their moths by sticking to them and then hardening as it dries out.

Wood Ashes:

May repel some types of insects if sprinkled on plants; if spread in a ring around plants and moistened, they may repel cutworms.

SESSION TITLE: Record Keeping Review/Marketing

SESSION #55 WEEK #4 DAY #19 (55-4-19)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:00 C

INTRODUCTION: SESSION OBJECTIVES

This session will help trainees view the current status of the "training farm" by reviewing the records that are being kept. They will look at, analyze and discuss records relating to:

- o Maintenance
- o Laying Hens
- o Crops
- o Hens/Chicks
- o Seed Germination
- o Other records

The purpose of this session is:

- o To determine whether adequate records are being kept.
- o To see whether what is on paper represents the real situation on the farm.
- o To redesign forms or add new record keeping forms if necessary.
- o To consider record keeping in rlation to marketing.

HAND-OUT:

READING ASSIGNMENTS:

TECHNICAL VOCABULARY:

SESSION TITLE: Planting Situations

SESSION #56 WEEK #4 DAY #19 (56-4-19)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

This session will basically inform the trainees of the many types of planting situations they will find at their sites and how to make decisions concerning plot locations. The trainees will also learn:

- o The factors that should be considered when deciding what vegetables to plant and where each type would be the most productive.
- o What major elements are involved and how to plan around them.
- o How to plan garden plots once they arrive at their sites.

HAND-OUT: #56-a Planting Situations
#56-b Garden Planning Exercise (Thailand).
#56-c Choosing a Vegetable Garden Location
#56-d Using the Right Type of Seedbed

READING ASSIGNMENTS: Intensive Vegetable Gardening, Pgs 55-67.
Small Vegetable Gardens, Pgs 4-27, 4-36.

TECHNICAL VOCABULARY:

HAND-OUT #56-a

PLANTING SITUATIONS

1. You're at a school in Petchaboon Province near the Basak River. The soil is very fertile and has a moderate amount of organic matter. Your plot is on a slight slope and has good drainage. It's May (the hot season) and the temperature gets up to 39 degree C in the day and drops to 29 degree C at night. It hasn't rained for a month and you can't count on much for 2 months, but there's a spigot 50 meters from your plot. Your plot is 1 "ngan" (1/4 rai or 400 sq m). What would you plant and why?

2. You're at a school in Khon Kaen. Your soil is very sandy with no fertility. In fact, there's no topsoil, because your school is on a hill and the minute amount of topsoil was long ago washed and blown away. Water drains away very quickly on your plot,which is on level ground. It's December and temperatures range from 10 degree C to 28 degree C. There's no rain, but your plot is next to a pond. You've a rai of land to plant on and access to some pig manure. What would you plant and why?

3. Your school is at the base of a mountain in Nan Province. The land slopes 5% and erosion is a problem, especially now in August (the rainy season). The soil has low fertility, but still has some topsoil as the land was only recently cleared. Temperatures go as low as 20 degree C at night and up to 33 degree C on a cloudy day. You've a strip of land along the school fence that is 12 m x 100 m. What would you plant and why?

4. Your school is along the Mekhong River in Nakorn Phanom Province. The soil is sandy and poor. A sheet of rock lies 1 to 2 meters below the surface and is exposed in some places. Your agricultural plot is used as a rice field in the rainy season, but it's January and nothing is there except stubble and weeds. Temperatures range from 5 degree C at night to 23 degree C in the day. You've got 1 rai of land and a well that won't go dry. What will you plant and why?

HAND-OUT #56-b

GARDEN PLANNING EXERCISE - THAILAND

You are a teacher at Meuang Ban School and have been asked to assist in planning the utilization of 1.25 rai (2.5 rai = 1 acre) for planting vegetables and some field crops throughout the year. You have 30 students (age 10-12 years) at your disposal to do the actual work, along with their other studies, during the school day. Most of the crops will be used to supplement the nutritional needs of the students - though it is hoped there will be some extra to sell at the market.

The school well is deep enough to provide water for up to 1.25 rai of vegetables in the dry season. Hot season vegetables can be planted beginning in January. If not following rice, legumes can be planted earlier than normal at the end of August.

SOIL:	Clayey; pH of 6.0; low in N, P; 0-3% slope
FERTILIZERS:	See Hand-out #49-b. Budget up to 600 Kg for the year.
ORGANICS:	Each student will be able to bring 20 Kg of cow manure from home in October and there is 300 Kg of duck manure (available free or donated) from a local farm in February.
INSECT PROBLEMS:	Aphids Bean leaf beetles Flea beetles Corn ear worm
DISEASE PROBLEMS:	Damping off Early blight Powdery mildew

GUIDELINES: Your garden plan should include the following:

1. Planting and harvest dates for the various crops; assume that it's now mid-August and you're all set to start.
2. Area alloted per crop. Amount of seed, transplants needed, seedbed needed.
3. Seedbed style.
4. Raw spacing and in-row spacing for the various crops.
5. Kind and amount of fertilizers that will be needed and how they will be applied and at what rates.
6. Estimated yields.
7. General watering schedule.
8. Methods of weed control.

HAND-OUT #56-c

CHOOSING A VEGETABLE GARDEN LOCATION

Here are some important factors to consider:

1. Soil factors: Good drainage is a must and can be enhanced by using some form of raised seedbed. Very clayey or sandy soils can be improved by large additions of organic matter (compost, manure or both; rice hulls help loosen up clay). Try to avoid very rocky or shallow (less than 18") soil. If the slope is much more than 3-4% (3-4 ft drop per 100 ft), some erosion control measures will be needed like contour planting or mulching.

2. Shade: Less of a problem in the tropics due to the higher sun angle, but beware of nearby tall trees. Most vegetables prefer at least 7-8 hours of sun a day. However, partial shading may be beneficial when trying to grow heat sensitive vegetables like lettuce in hot weather. Watch out also for competition from tree roots.

3. Availability of water: Even very rainy climates have dry spells, but provision for irrigation water is vital in areas with a distinct dry season.

4. Protection from animals: Many garden projects have been temporarily devastated by animals, especially cattle, pigs, and goats. Some type of protective fencing is necessary.

5. Wind protection: Exposed plants can be seriously damaged by whipping or stem breakage due to heavy winds. In hot, semi-arid areas such as along the Senegal River in Mauritania, hot, drying winds can literally dry up plants. Some windbreak protection is usually needed for most gardens (i.e. buildings, a hill, planted windbreaks, trees).

6. Protection from pilferage: The best security is locating the site near a house.

HAND-OUT #56-d

USING THE RIGHT TYPE OF SEEDBED

The right type of seedbed varies more with climate and soil than with the crop. The common ones are:

RAISED BEDS OR RIDGES: Under conditions of high rainfall and/or poor drainage, crops are usually planted on raised up beds or ridges to keep them from getting "wet feet"; they're also essential when furrow irrigation is used. (In some areas, at the start of the wet season when rains are lighter, field crops like maize, sorghum, and beans are planted on flat beds and then gradually hilled up as the season progresses; this only works with plants that have enough stem height and leaf clearance to tolerate this partial burial). Raised beds are especially well suited for intensive vegetable growing for reasons beyond drainage:

1. They keep the soil looser since there's no need to walk on them. The bed's width should allow all the plants to be reached by hand from the alleyways (about 1-1.5 meters is best).

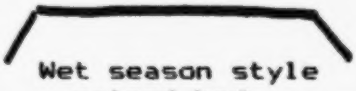
2. There's less bending over involved.

3. You end up with a double thick layer of topsoil.

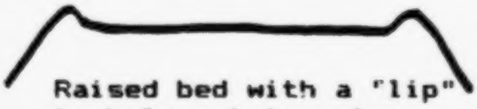
4. They reduce the incidence of soil-borne diseases caused by poor drainage.

5. The raised bed makes it possible to use very narrow rows or even equidistant plant spacing, since you don't need to walk among the plants.

Raised beds can also be used under low rainfall or for sandy soils, but their height should be reduced (may be 8-10 cm high vs 15-20 cm high). Mulching would help cut down the extra moisture losses raised beds are subject to under dry conditons. Making a "lip" around the edge of the bed will also help.



Wet season style
raised bed



Raised bed with a "lip"
to help retain water
under drier conditions

FLAT SEEDBEEDS: Used where moisture is adequate for crop growth and there are no drainage problems.

SUNKEN SEEDBEDS: Under low rainfall or very sandy soil conditions, vegetables may be planted in slightly sunken beds or in slightly sunken furrows to improve moisture availability. In arid conditions, shallow rooted crops like onions that have frequent watering needs can be grown in sunken beds a few centimeters below normal soil level.

SESSION TITLE: Plant Disease and Control

SESSION #57 WEEK #4 DAY #20 (57-4-20)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:30 F/C

INTRODUCTION: SESSION OBJECTIVES

Plant diseases are more abundant in tropical regions than in temperate regions. Therefore, it is important that the trainees have experience with the common plant diseases of the host-country. During this session the trainees will be able:

- To identify a healthy plant from one that is diseased.
- To determine the cause of the disease by observing the symptoms.
- To identify the disease as bacteria, fungus or virus.
- To understand the methods of control for each type of crop with each type of disease.

HAND-OUT:

READING ASSIGNMENT: *Knotts' Handbook for Vegetable Growers*, Pgs 210-228.

TECHNICAL VOCABULARY:

Disease
Method
Control
Identify
Symptons
Cause
Bacteria
Fungus
Virus
Wilt

SESSION TITLE: Maintenance

SESSION #58 WEEK #4 DAY #20 (58-4-20)

PRESENTER:

CO-FACILITATOR:

TIME: 9:30-11:00 F

INTRODUCTION: SESSION OBJECTIVES

Refer to Session #33-2-9 for details on maintenance.

This session can also be used by trainees for individual plot evaluations. The trainer could give out Hand-out #62-a so that trainees could evaluate their plots before the Trainer Plot Evaluations the next day for comparisons during Progress Review. (See Session 62-4-21 for details.)

SESSION TITLE: Quiz II

SESSION #59 WEEK #4 DAY #20 (59-4-20)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

Another eleven days have passed and it is time for a more detailed assessment of learning. In addition to what was covered by Quiz I, trainee problem solving abilities are assessed (see Session #37-2-10). Because this quiz may take longer to complete than the first one, this quiz can be taken home and completed in two nights.

Objectives are:

- Same as Quiz I, plus;
- To measure trainee capacity to solve common agricultural problems, especially those that have occurred during this training.

HAND-OUT: Quiz II.

READING ASSIGNMENT: Review hand-outs and readings.

TECHNICAL VOCABULARY:

Problem
To analyze
To solve

SESSION TITLE: Fruit Tree Propagation

SESSION #60 WEEK #4 DAY #21 (60-4-21)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-11:00 F/C

INTRODUCTION: SESSSION OBJECTIVES

With fruit of all types abundant in the-host country and of major importance in the diet of most people, it seems appropriate that the trainees learn the arts connected with developing new fruit sources as well as how to improve existing plantings. Therefore the objectives of this session will teach the trainees the following techniques and skills:

- To identify the different fruit tree species and understand the appropriate technique for propagation for each type.
- To develop the skills necessary for the three most common types of fruit tree propagation, i.e. cleft grafting, approach grafting and air layering.
- To thoroughly understand the concepts for sexual and asexual propagation.
- To know how and why to select proper propagation material and root stocks.
- To properly use equipment and materials for successful propagation.

HAND-OUT: #60-a Fruit Tree Propagation

READING ASSIGNMENTS:

TECHNICAL VOCABULARY:

Propagation
Grafting
Air layering
Stock
Scion
Coconut husk
Select
Grafting knife
Plastic tape
Plastic bag
Hang
Clay soil

HAND-OUT #60-a

FRUIT TREE PROPAGATION

There are two ways to propagate fruit trees.

1. Seed or sexual propagation.

2. Vegetative or asexual propagation: cutting, air layeri budding, grafting.

Before we select any method for propagation we should discuss the advantages or disadvantages of each method.

ADVANTAGES OF SEED PROPAGATION	DISADVANTAGES OF SEED
1. Easy to do and can get a lot of plants at one time.	1. Easy to have mutant and usually get recessive characteristic.
2. Small in size and easy when transporting.	2. Take longer to be able to provide fruit.
3. Won't get virus disease from mother plant.	3. Tall plants, harder to maintain and harvest.
4. Good root system.	4. Size of plants are not uniform.
5. Can have mutation.	5. Some plant seeds are hard to germinate.

ADVANTAGES OF VEGETATIVE PROPAGATION	DISADVANTAGES OF VEGETATIVE PROPAGATION
1. Get the same type of plant.	1. Need practice & experience to be able to do well.
2. From planting to fruit in less time.	2. Branches or stocks are big and take more room to store or tansport.
3. Plant is not so tall and is easy to harvest.	3. If mother plants have virus the new stock can have it too.
4. Size of plants are uniform.	4. No tap root.
	5. No mutation.

SESSION TITLE: Introduction to Marketing (Animals)

SESSION #61 WEEK #4 DAY #21 (61-4-21)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

Marketing of crops and animals is of equal importance to their production. Without marketing, production becomes a high risk business with returns on investments unplanned and unguaranteed. Therefore it is important that trainees learn the basic principals of marketing and:

- o Understand how the marketing system of the host-country is structured.
- o What pre-planning is necessary for successful transactions.
- o What the market demands in terms of quality and how it affects price.
- o How to prepare and present products for sale for highest returns.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Market
Quality
Price

Merchant
Process

SESSION TITLE: Plot Evaluations

SESSION #62 WEEK #4 DAY #21 (62-4-21)

PRESENTER:

CO-FACILITATOR:

TIME: 13:30-14:30 F

INTRODUCTION: SESSION OBJECTIVES

This session only involves the agricultural technical trainers (crops) and is specifically designed as one method of evaluating trainee performance to date.

The hand-out #62-a could be given to the trainees prior to session #58, week #4, day #20 and during this session they would evaluate their own plots. Their evaluation would be compared with the trainer's evaluation and discussed during session #72 week #5, day #25, with each trainee at his/her plot--on a one-to-one basis.

These evaluation results would be presented and compared at the regularly scheduled staff progress review.

INDIVIDUAL PLOT EVALUATION FORM
HAND-OUT #62-a

NAME___________________PLOT #________ EVALUATOR _______________

	General Plant Health	Watering	Weeds	Spacing/ Thinning	Mulching	Erosion	Insect Control	Trellissing/ Staking
Cucumber								
Water Melon								
Thai Melon								
Pumpkin								
Beans								
Radish								
Morning Glory								
Onion								
Flowers								
Chinese Cabbage								
Tomato								
Chili Pepper								
Mustard Greens								
Flowers								
Corn								

SESSION TITLE: Mixing and Applying Pesticides

SESSION #63 WEEK #4 DAY #22 (63-4-22)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Insect control is of major importance to successful crop production. Therefore it is important that trainees know how to mix and apply chemicals properly and safely as well as how to operate and maintain the spraying equipment. This session will gives the trainees experience in:

- Acquiring the skills necessary and the proper techniques of mixing pesticides safely.
- Developing the skills for calibrating pesticide spray equipment.
- Learning proper methods of mixing wettable powders and emulsifiable concentrate liquids.
- Learning how to calculate the amount of commercial product (formulation) needed to provide the amount of actual insecticide. (Chemical)
- Learning the basic skills of insect monitoring or when it is the optimum time to spray.
- Learning how to operate and maintain spraying equipment.

HAND-OUT: #63-a Knotts Handbook for Vegetable Growers, Pgs 200-205 (Calibration Charts)

READING ASSIGNMENT: Knotts Handbook for Vegetable Growers, Pgs 182-185.

TECHNICAL VOCABULARY:

Gloves
Bucket
Insecticide
Calibrating
Formulation
Monitoring
Protective clothing
Pump type sprayer
Measuring cup and spoon
Wettable powders
Emulsifiable concentrate liquids

HAND-OUT #63-a

SPRAY EQUIVALENTS AND CONVERSIONS

Pesticide containers give directions usually in terms of pounds or gallons of material in 100 gal of water. The following tables make easy the conversion for smaller quantities of spray solution.

SOLID EQUIVALENT TABLE

100 gal	25 gal	5 gal	1 gal
4 oz	1 oz	3/16 oz	1/2 tsp
8 oz	2 oz	3/8 oz	1 tsp
1 lb	4 oz	7/8 oz	2 tsp
2 lb	8 oz	1-3/4 oz	3 tsp
3 lb	12 oz	2-3/8 oz	1-1/2 tbsp
4 lb	1 lb	3-1/4 oz	2 tbsp

LIQUID EQUIVALENT TABLE

100 gal	25 gal	5 gal	1 gal
1 gal	1 qt	6-1/2 oz	1-1/4 oz
2 qt	1 pt	3-1/4 oz	5/8 oz
1 qt	1/2 pt	1-9/16 oz	5/16 oz
1-1/2 pt	6 oz	1-1/4 oz	1/4 oz
1 pt	4 oz	7/8 oz	3/16 oz
8 oz	2 oz	7/16 oz	1/2 tsp
4 oz	1 oz	1/4 oz	1/4 tsp

DILUTION OF LIQUID PESTICIDES TO VARIOUS CONCENTRATIONS

Dilution	1 gal	3 gal	5 gal
1-100	2 tbsp + 2 tsp	1/2 cup	3/4 cup + 5 tsp
1-200	4 tsp	1/4 cup	6-1/2 tbsp
1-800	1 tsp	1 tbsp	1 tbsp + 2 tsp
1-1000	3/4 tsp	2-1/2 tsp	1 tbsp + 1 tsp

Adapted from R.F. Sandsted et al., Cornell Recommendation for Commercial Vegetable Production. New York State College of Agriculture. Cornell University, (1979).

INSECTICIDE DILUTION CHART

Actual Insecticide (lb/acre or /100 gal):	1/2	1	3	5
Commercial Products (%, by weight of actual chemical)*	**Amount of Commercial Product (formulation) Needed to Provide Actual Insecticide (chemical) (lb)**			
15-20% EC (1-1/2 lb/gal)	1-1/3 qt	2-2/3 qt	2 gal	3-1/3 gal
23-25% EC (2 lb/gal)	1 qt	2 qt	1-1/2 gal	2-1/2 gal
42-50% EC (4 lb/gal)	1 pt	1 qt	3 qt	5 qt
60-65% EC (6 lb/gal)	2/3 pt	1-1/3 pt	2 qt	3-1/3 qt
72-80% EC (8 lb/gal)	1/2 pt	1 pt	1-1/2 qt	2-1/2 qt
15% WP	3-1/3 lb	6-2/3 lb	20 lb	33-1/3 lb
25% WP	2 lb	4 lb	12 lb	20 lb
40% WP	1-1/4 lb	2-1/2 lb	7-1/2 lb	12-1/2 lb
1% dust or granules	50 lb	100 lb	300 lb	500 lb
1-1/2% dust or granules	33 lb	67 lb	200 lb	333 lb
2-1/2% dust or granules	30 lb	40 lb	120 lb	200 lb
5% dust or granules	10 lb	20 lb	60 lb	100 lb

Adapted from D.N. Ferro, G.W. Moorman, and R.J. Precheur, *Insect, Disease and Weed Control for Vegetable Crops in Massachusetts*, Massachusetts Cooperative Extension Service C-137 (1978).

* WP = Wettable powder;
EC = Emulsifiable concentrate liquid.

Hand-out #63-a (Continued)

PESTICIDE APPLICATION RATES FOR SMALL PLANTINGS

Distance Between Rows (ft)	Amount (gal per acre)	Amount (qt per 100 ft of row)	Length of Row Covered (ft/gal)
1	75	2/3	581
	100	1	435
	125	1-1/6	348
	150	1-1/3	290
	175	1-2/3	249
	200	1-5/6	218
2	75	1-1/3	290
	100	2-1/6	218
	125	2-1/3	174
	150	2-3/4	145
	175	3-1/4	124
	200	3-2/3	109
3	75	2-1/16	194
	100	2-3/4	145
	125	3-1/2	116
	150	4-1/8	97
	175	4-3/4	83
	200	5-1/2	73

SPRAY ADJUVANTS OR ADDITIVES

Adjuvants are chemicals that, when added to a liquid spray, make it mix, wet, spread, stick or penetrate better. Water is almost a universal diluent for pesticide sprays. Water is not compatible with oily pesticides, and an emulsifier may be needed to obtain good mixing. Furthermore, water from sprays often remains as large droplets on leaf surfaces. A wetting agent lowers the interfacial tension between the spray droplet and the leaf surface and thus moistens the leaf. Spreaders are closely related to wetters and help to build a deposit on the leaf and improve weatherability. Stickers cause pesticides to adhere to the sprayed surface. They are oily and serve to increase the amounts of suspended solids held on the leaves of fruits by holding the particles in a rain-like film.

Recently a new group of materials called extenders has been developed. Extenders form a sticky, elastic film that holds the pesticide on the leaves and thus reduces the rate of loss due to sunlight and rainfall.

Spray adjuvants for use with herbicides often serve a function distinctly different from that of adjuvants used with insecticides and fungicides. For example, adjuvants such as oils used with atrazine greatly improve penetration of the chemical into leaves, rather than just giving more uniform coverage. Do not use an adjuvant with herbicides unless specifically recommended.

Adapted from R.F. Sandsted et al., Cornell Recommendations for Commercial Vegetable Production. New York State College of Agriculture, Cornell University (1979).

GUIDELINES FOR EFFECTIVE PEST CONTROL

Often failure to control an insect, mite, or disease is blamed on the pesticide even though the cause may lie elsewhere. Among the more common reasons for failure are the following:

1. Delaying applications until pests become too large or too numerous.

2. Making applications with insufficient gallonage or clogged and/or poorly arranged nozzles.

3. Selecting the wrong pesticide.

Follow these suggestions to ensure more effective pest control:

1. Inspect field regularly: Keep abreast of pest buildup. Frequent examinations (at least twice a week) help to determine the proper timing of the next application.

2. Control insects and mites according to schedule: Many pest problems can be predicted to occur at approximately the same time year after year. Examples are corn earworm, cabbage looper, and Colorado potato beetle. One application before buildup often eliminates the need for several applications later in the season. Often less toxic and safer-to-handle chemicals are effective when pests are small in size and population. After pest buildup, more toxic chemicals frequently are needed to control infestations. If possible, spray when the weather is ideal. Spray only when wind velocity is less than 10 mph. Dust only when it is calm. Do not spray when plants are wilted during the heat of the day. Sprinkler irrigation washes insecticide deposits from foliage. Wait at least 48 hours after insecticide application before irrigating. More frequent applications may be needed during and after periods of heavy rainfall.

3. Strive for adequate coverage of plants: The principal reason aphids, mites, cabbage loopers, and diseases are serious pests is that they occur beneath leaves where they are protected from spray deposits or dust particles. Improved control can be achieved by adding and arranging nozzles so that the application is directed toward the plants from the sides as well as the tops. In some cases, nozzles should be directed for application beneath the leaves. Sprays from high-volume, high-pressure rigs (airblast) should be applied at rates of 40-100 gal/acre at approximately 400 psi. Sprays from low-volume, low-pressure rigs (boom type) should be applied at rates of 50-100 gal/acre at approximately 100-300 psi.

4. Select the proper pesticide: Know the pest(s) to be controlled and use recommended pesticides and rates of application.

Adapted from Commercial vegetable production recommendations. Maryland Agricultural Extension Service EB-236 (1979).

VEGETABLE SEED TREATMENTS

Various vegetable seed treatments prevent early infection by seedborne diseases, protect the seed from infection by soil microorganisms, and guard against a poor crop stand or crop failure caused by attacks on seeds by soil insects.

Two general categories of vegetable seed treatments are used. Eradication treatments kill disease-causing agents on or within the seed, whereas protective treatments are applied to the surface of the seed to protect against seed decay, damping-off, and soil insects. Hot-water treatment is the principal means of eradication, and chemical treatments usually serve as protectants. Follow time-temperature directions precisely for hot-water treatment and label directions for chemical treatment. When insecticides are used, seeds should also be treated with a fungicide.

HOT-WATER TREATMENT

To treat seeds with hot water, fill cheesecloth bags half full, wet seed and bag with warm water, and treat at exact time and temperature while stirring to maintain a uniform temperature. Use an accurate thermometer.

HOT-WATER TREATMENT OF SEEDS

Kind	Temperature (degree F)	Time (minutes)	Diseases Controlled
Broccoli, cauliflower	122	20	Alternaria, black leg black rot
Brussels sprouts, cabbage	122	25	Alternaria, black leg black rot
Celery	118	30	Early blight, late blight
Eggplant	122	25	Seed rot
Pepper	122	25	Bacterial leaf spot
Tomato	122	25	Anthracnose, canker, speck, spot

CHEMICAL SEED TREATMENTS

The most frequently used fungicides are thiram and captan applied as a dust or slurry. Large-seeded vegetables may be protected from attack by soil insects by combining diazinon, lindane, or lorsban with fungicides. Use only on crops if approved for such use, and follow label directions.

SESSION TITLE: Chicken Records Analysis

SESSION: #64 WEEK #4 DAY #22 (64-4-22)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Record keeping is important not only for animals but anywhere there is input and output. Accurate records confirm three basic points. How much did you spend? How much did you take in? How much was left over (profit)? This session will assist the trainees:

- o In acquiring an understanding of the importance of accurate record keeping for all livestock raising activities.
- o To use records from the training farm to calculate flock preformance compared to accepted norms and strategies to improve returns.
- o To discuss ways of motivating students to maintain adequate records at their sites.

HAND-OUT: #64-a Field Notebook Outline - Poultry.

READING ASSIGNMENT: Practical Poultry Raising, Pgs 153-168.

HAND-OUT #64-a

FIELD NOTEBOOK OUTLINE - POULTRY

I. RAISING CHICKS

1. Preparation for receiving chicks.

2. Breed.

3. Date bought # Date sold #

4. Space requirements (floor space, feeders, waterers).

5. Housing (roof, floors, litter, feeders, waterers, lime at entry).

6. Brooding system.

7. Vaccination program including: vaccine, date, product, method.

8. Control of internal and external parasites (date, product, method).

9. Feeding program (including different rations and their protein level).

10. Locally available foodstuff (include maximum percent permissible in diet).

11. Diseases (if they appear) include: symptoms, causes, and means of control.

12. Other (check lists, record sheets, etc.)

II. BROILERS

1. Weight at 7th and 8th week.

2. Selling price (amount per kilo).

3. Weekly and total feed consumption and cost.

4. Feed conversion rate.

III. LAYERS

1. Start of laying date.
2. Nest space requirements.
3. Debeaking (date, method).
4. Culling (date, number culled).
5. Calcium and/or phosphorus source.
6. Pounds of feed per dozen eggs.
7. Laying rate (include date and expected production).
8. Artificial lighting (system, number hours per day).
9. Molting (system, date started, date of return to maximum production).
10. Vaccination program and parasite control.

SESSION TITLE: Program Manager II

SESSION #65 WEEK #4 DAY #22 (65-4-22)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

During this session the Program Specific (Education) Program Manager talks with trainees about the host-country (Thai) bureaucracy.

Objectives are:

- To provide an overview of the structure and working of the Thai bureaucracy;
- To mention some problems PCVs have with the bureaucracy and to suggest how to deal with these problems.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Swine Management Skills

SESSION #66 WEEK #4 DAY #23 (66-4-23)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

This session is important in that it covers the entire range of swine production skills which are relevant to even small-scale producers. The trainees will:

- o Gain the confidence they need to handle swine.
- o Acquire the skills necessary to establish credibility, in swine production, at their sites.

HAND-OUT: #66-a Management Techniques for the Care of Piglets.

READING ASSIGNMENTS: Small-Scale Pig Raising, Pgs 150-169.

TECHNICAL VOCABULARY:

Cut
Teeth
Medicine
Syringe

Iron
Castrate
Injections

HAND-OUT # 66-a

MANAGEMENT TECHNIQUES FOR THE CARE OF PIGLETS

Needle Teeth

Piglets are born with 8 tiny "needle" teeth that are so named because of their sharp tips. If left unclipped they are used by piglets to compete with one another. The results of such competition are scratched up sow's teats, which can lead to infections and/or mastitis, and the piglets will chew on the sides of each others faces while competing for milk. To prevent this scratching and chewing, it is best to clip the ends of these teeth. Wire cutting pliers or toe nail clippers can be used to remove the top one third of each tooth. Care must be taken to make a clean cut and not break the tooth off, because a broken tooth can cause gum infections and abcesses. Hold the piglet's mouth open with your finger far back between the jaws and snip the needle teeth with the clippers in the other hand.

Tail Docking

Tail docking is a practice that should be used in high level management conditions where pigs are being raised in a clean environment and subject to crowded conditions. Chewing results because of the stress of overcrowding. Pigs chew the tails of other pigs near them. Since there is very little feeling in the last third of the tail, crippling infections can occur from the open wounds that result from chewing. When the pig is about one week of age (provided that it appears healthy and unstressed) a sharp knife can be used to rem,ove the tip of the tail. It is important to apply a disinfectant, such as iodine, to the wound after clipping. In a free-ranging environment where pigs have plenty of room, this is not a necessary or recommended practice, since it does open a wound to infection.

Iron Shots

Piglets are born quite anemic due to a very low reserve of iron. Iron is needed to produce the oxygen carrying hemoglobin in the blood. The sow does not provide iron in her milk, so piglets must get it from another source. Free-ranging pigs will eat soil while rooting in order to get the needed iron. Pigs raised in confinement on cement or wood floors need another source. One way to provide iron to piglets quickly and easily is to give a 1 to 2 cc injection of a liquid iron solution. Piglets that do not receive this injection within the first two weeks of life never produce to theri genetic potential and should not be considered as high production pigs. This intramuscular injection should be given in the ham .some time within the first three days after farrowing. Avoid veins and arteries when giving this shot. Clean the flesh where the shot is to be given with an alcohol saturated cotton ball. Aspirate (draw back the plunger of the syringe) after the needle is poked into the ham to see if blood enters the syringe. If blood enters the syringe, you have the needle inside an artery or vein and you need to move it. If no blood enters the syringe, then depress the plunger and complete the injection. Be sure to wipe the needle down with alcohol before doing the next injection. Syringes and needles should be boiled after finishing with one litter before injecting another.

Castration: Castration is the practice of removing the testicles from the male pigs and may be practiced for any of the reasons below:

1. Prevents uncontrolled breeding in the herd.
2. Gives the farmer control over which boars he/she wishes to use as breeding stock.
3. Some feel that castration can improve the f/g ratio of young boars.
4. Castrated boars are of a more even temperament than uncastrated boars.
5. The meat of a castrated boar has a less gamy or strong flavor than that of an uncastrated boar.
6. In many cultures, people prefer eating a boar if if has been castrated.

Ideally, castration should be done with young piglets when they are two weeks of age. Castrating them at this age is best because smaller wounds are made, healing is rapid, and it is less stressful for the piglet than if done later.

Procedure: Castrating a piglet will require two people. The holder places the piglet on its back in his or her lap with the rump facing up. The piglet's hind legs should be held forward. This presses the testicles tightly against the scrotum while at the same time restraining the piglet. If the scrotum area is dirty, wash it with soap and water and then with a disinfectant. The person doing the cutting presses the testicle against the skin on the side of the scrotum between the thumb and the forefinger and slices down with a sterile razor blade. Make only one cut and do not saw. Pressure behind the blade should cause the cut to pass through the skin and into the testicle. If the blade cuts the testicle, it is okay, because it will be gone soon. The cut should be a half inch to and inch long and low oth the scrotum to assure proper drainage from the wound. Remember that "low" will appear high on the upturned piglet. As soon as the incision is made, press the testicle through the openinng and pull it gently away from the piglet's body. It will be attached by what appears to be one piece of stringy tissueG. Actually, there are two vessels closely attached to one another; the sperm duct, which is white and the blood vessels which are red. First, cut through the white sperm cord. Then pull the blood vessel out until you feel a little tension and snip it off as close to the body as possible. When you have completed the removal of the second testicle, apply disinfectant and release the piglet.

SESSION TITLE: Fertilizer Math and Introduction to Metric IV

SESSION #67 WEEK #4 DAY #23 (67-4-23)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:00 C

INTRODUCTION: SESSION OBJECTIVES:

Applying fertilizer for increased yeilds is extremely important, but applying the right amounts of the right elements is more important. This will, in effect, have the most dramatic effect on profit and loss. This session is designed to develop the math skills for:

1. Calculating the most economical source of N given the choice of several blends and straight N fertilizers.

2. Determining the amount of fertilizer for any given area, per plant, per meter of rwo length in Kg/ha or lbs/acre.

3. Using metric calculations in the host country.

HAND-OUTS: #67-a Take Home Math Quiz

READING ASSIGNMENT: Soils, Crops and Fertilizer Use, pages 50-52.
Intensive Vegetable Gardening, pages 39-41.

TECHNICAL VOCABULARY:

HAND-OUT # 67-a
TAKE HOME MATH QUIZ

Introduction: The following quiz is not to test your skills in fertilizer math and the metric system but to assist you in developing your skills in these areas. The objectives are for you to compute the correct solutions as well as to know how you got them.

1. If you are to apply chemical fertilizers at the following rates (15-15-15 at 44 kg/rai and 21-0-0 at 80 kg/rai, how much would you apply to 500 square meters?

2. What would the total N-P-K be in kg/rai?

3. What would the application rates of 44 kg/rai and 80 kg/rai be if calculated in lbs/ac?

4. Assume that the following types of seeds have a germination percentage of: corn 70%, beans 80%, cabbage 90%, cucumbers 60% and pumpkin 95%. Using the following information, how much of each type would you plant to receive optimum plant population?

Vegetables	Recommmended lbs/ac assuming 100% Germination	Actual lbs/ac
corn	12 lbs/ac	
beans	40 lbs/ac	
cabbage	1.5 lbs/ac	
cucumbers	3 lbs/ac	
pumpkins	1 lb/ac	

5. Convert the above to KG/rai and the answers to Kg/rai.

6. Imagine at your school you have an area of .55 rai which has never been used for agricultural purposes before. You and your co-worker have decided to plant mango trees in this area. The recommended spacings for mangos are 2x4 square meters.

   a. How many mango seedlings will you require?

   b. Of the three major nutrients N-P-K, which one will be the most important in the early stages of the mango seedling growth? why?

   c. After the trees are two years old and start to set fruit, the fertilizer recommendations for your area are 12-24-12, 300 Kg/rai.
   d. How many kg/tree would you apply?

   e. How and when would you apply this fertilizer?

7. a. Your vegetable garden is divided into three groups:
Group A: kale, cabbage, chinese cabbage, morning glory
Group B: cauliflower, broccoli and curcubits
Group C: Japanese radish, carrots and beet roots

b. None of these groups received fertilizer pre-plant.

c. At what stage will you apply fertilizer?

d. What type of fertilizer N-P-K will you apply to each group? why?

8. Convert the following:

From	**To**	**To**
1 acre foot of soil=	lbs=	kgs
1 rai-30 cm of soil=	kgs=	lbs
1.5 cubic meters =	cuft=	cu. yds.
1.4 cubic meters =	liter	US gals.
1.5 US gal=	liters=	ml
4.5 rai =	square meter=	acres
2 acres =	square meter=	rai
2 hectare =	acres =	rai
2.8 feet =	cm =	m
2.5 m =	cm =	inches
3 lbs =	gms =	kgs
32 oz =	gms =	kgs
400 gms	lbs	kgs
1400 gms	lbs	kgs
5 metric tons =	kgs =	US tons
100 km =	miles =	meters
10/km/l =	miles/US gal	

SESSION TITLE: Maintenance

SESSION #68 WEEK #4 DAY #23 (68-4-23)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

Refer to Session 33-2-9 for details.

SESSION TITLE: Soil Conservation

SESSION #69 WEEK #4 DAY #24 (69-4-24)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

One serious problem area of the-host country that receives little attention is soil conservation. Many of the trainees' sites have lost or have very poor topsoil. This is true for many reasons including site location and construction. Therefore it is imperative that trainees:

- o Recognize good soil conditions and know the appropriate measures to maintain and conserve them.
- o Understand the common soil conservation problems of the host-country and how to improve or prevent serious erosion problems.
- o Understand the relationship between slope and surface drainage which when not controlled equal soil erosion.

HAND-OUT:

READING ASSIGNMENT: Soils, Crops and Fertilizer Use, Pgs 1-19.

TECHNICAL VOCABULARY:

Soil
Fertility
Topsoil
Organic matter
Structure
Erosion
Slope
Contour plowing
Contour planting
Cover cropping
Inter-cropping
Crop rotation
Dikes

Week #5

70	5	25	School Hierarchies and Relationships	08:00-09:00	C
71	5	25	Introduction to Field Day	09:30-10:00	C
72	5	25	Maintenance	10:00-12:00	F
-	-	-	L/CC	13:30-16:30	-
73	5	26	Introduction to Fruits	08:00-09:00	C
74	5	26	School Analysis	09:00-10:00	C
75	5	26	PCV Visit Preparation	10:00-11:00	C
76	5	26	Field Day Organizing Meeting	11:00-12:00	F/C
-	-	-	L/CC	13:30-16:30	-
77	5	27	Planting Fruit Trees	08:00-10:00	F
78	5	27	Independent Study	10:00-12:00	C
-	-	-	L/CC	13:30-16:30	-
79	5	28	Poultry Disease	08:00-10:00	C
80	5	28	Mushroom Follow-up	10:00-10:30	F
81	5	28	Quiz III	10:30-12:00	C
-	-	-	L/CC	13:30-16:30	-
82	5	29	Native Chicken Production	08:00-10:00	F/C
83	5	29	Phase I Evaluation	10:00-11:00	C
84	5	29	Maintenance	11:00-12:00	F
-	-	-	L/CC	13:30-16:30	-
-	-	-	L/CC/Dev	08:00-12:00	-

SESSION TITLE: School Hierarchies and Relationships

SESSION #70 WEEK #5 DAY #25 (70-5-25)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:00 C

The Session Design for this Program Specific Session is in Appendix A.

SESSION TITLE: Introduction to Field Day

SESSION #71 WEEK #5 DAY #25 (71-5-25)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-10:00 C

INTRODUCTION: SESSION OBJECTIVES

Before trainees can take charge of Field Day, the goals and guidelines for it must be explained. This should be done before "Introduction to Demonstrations," so that trainees understand how the demonstrations fit into Field Day and before the break so that trainees have enough time for planning.

The objectives of this session are:

- To explain the idea of Field Day, what has been done in the past and what might be done this time.
- To make clear to trainees the conditions and guidelines that must be followed for Field Day.
- To have trainees begin to think about their Field Day.

HAND-OUTS:	#71-a	Field Day
	#71-b	Sample Schedule
	#71-c	Field Day Guidelines

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To organize	Field Day
To advertise	Committee

HAND-OUT #71-a

FIELD DAY

Field Day is a series of method demonstrations, result demonstrations and scale-model demonstrations which can be focused on a central theme. These and other activities are strung out over the course of a day which, at your site, can be used to promote new practices and bring recognition to successful students and farmers in your area. The point of such a day is to call attention to new and exciting developments in agriculture. The prevailing mood is festive and the atmosphere is like that of a country fair.

Activities can include inviting special guests, cooking a big meal, sports, preparing presentations, music and dancing. It is not expected that farmers leave a field day having learned a great deal of specific information, but leave with new interests and new concepts of what is possible to accomplish.

The first consideration is to decide whether or not to have a theme--if so, what. The next concern is to come up with a list and sequence of demonstrations, booths, activities and other events and features. This is followed by planning the routing of guests through the course of the day, meals and refreshments, entertainment, and clean-up. A decision has to be made, for instance, to route guests through demos in a single, large group, in several smaller groups, or individually. This will depend on how large a turnout is expected and how many people are involved in organizing the day. For all of the different tasks, responsibilities need to be clearly designated.

Contingency plans should be made for late arrivals, rain, and slow-moving groups. It is useful to choose someone to monitor the progress of the day overall. This person can be responsible for setting any contingency plans in motion should they prove necessary.

The work involved in putting on a field day can be divided into stages. There are initial meetings at which decisions are made concerning field day topics, guests and the division of responsibilities among planners. These are followed by a period of early preparation during which presentations are rehearsed, invitations are sent out and meetings are held about routing of guests. Then come last minute preparations such as cooking, assembling materials for demonstrations and marking paths where guests will walk. On field day itself someone greets the guests, demonstrations are given, a big meal is eaten, someone thanks the guests for coming and then a clean-up crew goes to work. At your site, followup contacts should be initiated and continued over the course of the next few weeks or months.

Individual presentations should not exceed half an hour. Sufficient time is necessary at both the beginning and end of the day for guests to travel to and from their homes. Water, shade, and chairs should be available.

List of responsibilities to be considered:

1. Invitations.
2. Clear area around demonstration sites.
3. Set up/move chairs.
4. Master/Mistress of ceremonies.
5. Guides.
6. Presenters.
7. Refreshments and water.
8. Timer.
9. Entertainment.
10. Meal preparation.
11. Clean-up.

Reasons for Field Day:

1. To provide trainees with the opportunity to demonstrate the skills and knowledge they have acquired during training.

2. To identify field days as a useful promotional technique in attracting farmers to an agricultural program.

After trainees have presented activities they have designed and prepared, they meet with the trainers to evaluate the day. Trainees may start with a critique of their individual presentations. The trainee-planners may give a self-critique also, including how well they planned for the field day, conducted the planning meetings, etc. The trainers give constructive feedback to trainees on the field day.

Note: Trainees may be allowed to choose a theme. If trainers choose a theme, the opportunity exists to meet specific technical training objectives.

HAND-OUT #71-b

SAMPLE SCHEDULE

09:00-10:00	Music to attract arriving guests. Periodic announcements explaining events.
10:00-12:00	Demonstrations.
12:00-13:00	Chicken and other food is sold.
13:00-14:00	Entertainment and speeches.
14:00-14:30	Pig auction and chicken sales.
14:30-16:30	Sports.
16:30- ?	Clean-up.
19:00-21:00	Dinner (provided by staff), evaluation of field day and party.

(This is a very long day. Some events may be condensed or eliminated.)

HAND-OUT #71-c

FIELD DAY GUIDELINES

(a sample)

DATE:	Saturday, September 30, 1984
TIME:	(up to trainees)
LOCATION:	Any place accessible to villagers.
AUDIENCE:	Farmers and their families.
BUDGET:	Money raised by livestock, food and other sales, plus a specified (in advance) amount from training budget.
RECEIPTS:	Needed for all purchases.
LIVESTOCK:	All of the pigs raised during training will be auctioned or raffled on Field Day. Broiler chickens will be slaughtered, cooked and sold at a reasonable price. Extra birds can be sold live. All profits from livestock will go to defray Field Day expenses.
VEHICLES:	The van and pick-up will be made available, if requested though the Technical Coordinator.
DEMONSTRATIONS:	All trainees do one, in Thai, except, the master of ceremonies.
STAFF SUPPORT:	Will answer questions. Will not offer unsolicited advice and suggestions, except for the designated advisor.
MATERIALS AND EQUIPMENT:	Peace Corps equipment is available. Other items can be borrowed, rented or bought within budgetary limits.

SESSION TITLE: Maintenance

SESSION #72 WEEK #5 DAY #25 (72-5-25)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 F

INTRODUCTION: SESSION OBJECTIVES

Refer to Session 33-2-9 for details.

SESSION TITLE: Introduction to Fruits

SESSION #73 WEEK #5 DAY #26 (73-5-26)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:00 C

INTRODUCTION: SESSION OBJECTIVES

With fruits of many varieties abundant and popular in the host-country, it seems appropriate that the trainees become familar with:

- The many kinds and varieties grown in the host-country.
- The season in which they are available.
- The areas they grow in volume.
- The name of each.
- How they are propagated.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Tropical fruit
Propagate
Fruit
Temperate fruit
Grow
Available fruit names

SESSION TITLE: School Analysis

SESSION #74 WEEK #5 DAY #26 (74-5-26)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-10:00 C

The Session Design for this Program Specific Session is in Appendix A.

SESSION TITLE: PCV Visit Preparation

SESSION #75 WEEK #5 DAY #26 (75-5-26)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:00 C

INTRODUCTION: SESSION OBJECTIVES

Each trainee chooses the PCVs s/he will visit. Expectations for the visits are explained. Administrative and travel information is provided. For the visits to be successful and efficacious trainees must be provided with structure for activities as well as travel information. The objectives of this session are:

- To inform trainees about the objectives of the visits and what they're expected to do on the visits;
- To decide where the trainees will go;
- To inform trainees about logistical and administrative aspects of the visits.

HAND-OUT: #75-a PVC Visits

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

HAND-OUT #75-a

PCV VISITS
THAI TEFL (CROSSOVERS)

Please try to use your volunteer visit time to find out as much as you can about the actual conditions at the volunteer's site. Observe and/or ask questions about:

1. The volunteer's role at the (school) in both the (English) and (Agriculture) Departments:
    a. Number of hours of (teaching) by the volunteer in both departments.
    b. Size and quality of (English and agriculture) staff.
    c. Special projects or time commitments of the volunteer.
    d. Volunteer's positive and negative feelings about his/her place in (both departments.)
2. The volunteer's relationship with co-workers.
3. The volunteer's relationship with (students.
4. The volunteer's relationship [illegible] individuals in the community.
5. The dress-s[illegible] and behavior of (teachers) at the (school.)
6. The living-arrangement (food, shopping, laundry, entertainment) of the volunteer.
7. (School) facilities (especially English & Agriculture) including buildings and grounds.
8. The nature and size of surrounding villages.
9. How the PCV got started at his/her site.

This information will be helpful in understanding the similarities and differences between one site and the next, as well as one volunteer and the next, when we all return together and have a chance to discuss our experiences.

To help gather the above information, do the following:

1. Meet the (Principal.)
2. Meet the (agriculture teachers,) especially the department head.
3. Meet the (English teachers,) especially the department head.
4. Observe, and when possible help (teach) the PCV's (English classes.)
5. Participate in any (agriculture) work that the volunteer is doing.
6. Visit the market and buy something (fruit).
7. Visit a nearby village, ideally the home of a (student).
8. Observe, if possible, the teaching of a Thai (English teacher.)
9. Learn how the PCV signs in and requests supplies; get copies of the relevant forms.
10. Visit English and/or FFT clubs, if possible.
11. For men, drink with some male (teachers.)
12. Find out what the PCV considers his/her 3 most important contributions to the (school.)
13. Find out what the PCV considers his/her 3 most significant difficulties and understand why.

Many of these activities will take a short time, so you should be able to do almost all of them. Please take notes and, most of all, have fun with everyone.

SESSION TITLE: Field Day Organizing Meeting

SESSION #76 WEEK #5 DAY #26 (76-5-26)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

What happens in this session is up to the trainees; however we recommend that they consider the following objectives. Recommended objectives are:

- To choose a Field Day Coordinator.
- To define the tasks that need to be done in preparation for, during and after Field Day.
- To assign tasks and responsibilities to individuals and groups.
- To consider choosing a theme.
- To make tentative decisions on location, time and schedule.

HAND-OUT: #76-a Sample Task List

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To meet	Meeting
To decide	Coordinator
	Tasks
	Theme

HAND-OUT #76-a

SAMPLE TASK LIST

BEFORE FIELD DAY

Organize Meetings
Organize Schedule
Find Location
Plan Food and Cooking
Decorations
Music and Entertainment
PA System
Demonstrations
Advertising
Guests

ON FIELD DAY

Set-up
Greeters
Announcements, Emcee
Cook and Sell Food
Sports and Games
Time Keeper

AFTER FIELD DAY

Evaluate
Demonstration Feedback
Suggestions for next year and at their sites.

SESSION TITLE: Planting Fruit Trees

SESSION #77 WEEK #5 DAY #27 (77-5-27)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F

INTRODUCTION: SESSION OBJECTIVES

Fruit trees, like most types of trees, must be planted with care in order to produce normal growth. In tropical conditions the techniques used require more care due to the weather conditions. In the tropics you encounter very wet or dry conditions, either of which can adversely affect normal growth and production. This session will demonstrate how by properly planting one can overcome the adverse conditions and:

- The trainees will learn about different types of fruit trees and the technique for growing each.
- The soil, water and fertilizer requirement of each.
- The proper plant spacing for each variety.
- How to plant trees that are from grafts, air layering or from shoots such as bananas, as well as coconuts.

HAND-OUT: #77-a Instructions For Planting Fruit Trees

READING ASSIGNMENTS:

TECHNICAL VOCABULARY:

Fruit tree
Fruit
Grafted seedling
Air layer seedling
Manure
Mulching

Hoe
Shovel
Water can

HAND-OUT #77-a

INSTRUCTIONS FOR PLANTING FRUIT TREES

Fruit trees are divided by size of tree such as small, medium, and large. Most of the trees which are propagated by asexual propagation are usually medium size and not as big as growing from seed. Plant spacing for each type will be different according to the variety, location and purpose of planting.

PLANTING INSTRUCTION FOR MANGO GRAFTED SEEDLINGS

1. Dig the hole .50 x .50 x .50 m and leave the soil near the hole.

2. Mix soil: manure using the ratio 2:1

3. Fill the hole with mixture about half of the hole and water to firm the soil.

4. Fill up again to 15 cm from the top and plant the seedling with the joint of the graft above the soil level, cover up and firm the soil with hoe and water.

5. Mulching with dry grass or material available to keep moisture. If the weather is really hot it is recommended that you provide the shade for the new tree so it will not wilt.

6. Keep filling up around the tree for 1 or 2 weeks or until the ground is level.

SESSION TITLE: Independent Study

SESSION #78 WEEK #5 DAY #27 (78-5-27)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

By this time in training, trainees have probably developed personal interests in various agricultural areas. Some of these areas are not covered during training and few are covered in great detail. Still, trainees like to pursue their interests more deeply. Further, trainees will be preparing demonstrations for which they may need to do research. Finally, as PCVs, they will have to find most of their information on their own and should practice doing so. The objectives of this session are:

- o To pursue personal interests in greater detail than training provides.
- o To do background research for demonstrations.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Library
Interests
Research
Details
Topics

SESSION TITLE: Poultry Disease

SESSION #79 WEEK #5 DAY #28 (79-5-28)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 C

INTRODUCTION: SESSION OBJECTIVES

Diseases of poultry can seriously affect the profit margin of poultry production. This session will help the trainees:

- To understand some factors that encourage and help control diseases of poultry.
- Identify some economically important diseases, their symptoms and control.
- Develop the ability to use the poultry disease prevention/treatment resources provided to them.
- Explore their role in disease control at their sites.

HAND-OUTS: #79-a Introduction to Disease
#79-b Basic Poultry Disease Diagnostic Guide

READING ASSIGNMENTS: Practical Poultry Raising, Pgs 115-130.

TECHNICAL VOCABULARY:

HAND-OUT # 79-a

INTRODUCTION TO DISEASE

The purpose of this unit is: (1) to give trainees a better understanding of the causes, transmission, prevention, and treatment of animal diseases, (2) to allow them a clearer understanding of their own health, and how to maintain it, and (3) to becomes sensitive to health needs when they enter their community overseas.

By the integration of the two components, livestock and core, on this topic, it is felt that trainees will be able to reinforce their learning in a positive way.

DISEASE: A DEFINITION

Disease is a departure from a state of good health by an alteration of the internal organs or external conditions of the body. It is a disruption of the normal functioning and performance. Causes of diseases:

1. Infectious agents, or pathogens such as bacteria and virus.
2. Parasites, external (e.g., ticks) or internal (worms).
3. Heredity, caused by defective genes, e.g., in humans, sickle-cell anemia, swine melanoma.
4. Congenital defects caused by developmental accident during the embryonic stage or from toxic or infectious agent during prenatal development, e. g., pullorum disease in chickens; brucellosis in pigs, goats.
5. Nutritional deficencies, e.g., kwashiorkor (protein deficiency in children), poly neuritis (vitamin B deficiency in chicks).
6. Traumatism, e.g., wounds, burns.
7. Environmental stress, thermal stress, heat stroke, frost bite.
8. Man, animals and man overcrowding, poor housing and sanitation facilities.

TRANSMISSION AND SPREAD

Two methods of transmission are horizontal and vertical.

Horizontal

1. Direct or immediate contact with a diseased animal

    a. Sexual (brucellosis)
    b. Bodily contact (ringworm)

2. Contact with non-living objects, infected pens, litter, feeders, waterers.

3. Contact with disease carriers (animals infected but which do not have or exhibit disease).

4. Infection in the soil, food, and/or water.

5. Air borne infections, transmitted in the air by inhalation of disease agent.

    a. Intensive transmission which has a spread of 1 km, expelled by coughing and breathing in by others.

    b. Moderate transmission which has a maximum spread of 15 meters. Chronic respiratory problems can be transmitted this way.

    c. Low transmission in the air--needs tight contact (crowding) between animals to transmit pathogenic agents.

6. Infections from blood sucking arthropods such as flies, fleas, mosquitoes, lice, or ticks. Malaria (man) and anthrax (cattle) are diseases transmitted in this way.

7. Infections from organisms normally found on or in the animal's body. Streptococci are found in healthy animals but become dangerous if the animal is stressed and its defenses weakened.

8. Spoiled feed, molds, and fungi in the feed which produce toxins (mycotoxicosis and aspergilosis).

9. Fecal contamination, coccidiosis in chickens and hepatitis and cholera in both chickens and man.

A term usually used to explain the method of transmission of a disease is vectors. These can be either mechanical such as contaminated clothes, wild birds, insects; or included in the life cycle of a parasite, that is a biological vector, where a parasite has the pathogen within its system, rather than carrying it on its legs, wings, etc. and transmits the disease by biting the animal.

Vertical

1. Embryonic: The disease is spread congenitally, that is, the ovary or uterus which is infected transmits disease to the egg or fetus.

2. Artificial insemination: Offspring infected by infectious sperm.

3. In the case of chickens, eggs can be infected by fecal contamination from a disease in the intestinal tract.

4. Hereditary: Caused by defective genes.

DISEASE RESISTANCE

The animal's defense against disease carrying organisms.

1. Skin and mucous membranes: Tissue acts like a mechanical barrier to bacteria, yeast, and molds.

2. Mucous membranes produce fluid which washes away the pathogens. This primary defense is more effective against larger pathogens than viruses. If the skin is damaged by cuts, abrasions, or burns, infections may result. This means that the organism is in the body but it does not necessarily mean that the disease is present.

   Whether a disease will occur depends on the secondary defenses of the body.

SECONDARY DEFENSES (ex. a cut in the skin)

1. Bleeding washes the wound and removes bacteria.

2. Phagocytes are specialized white blood cells that eat and destroy bacteria.

3. If the number of bacteria is small then healing occurs. If not, then inflammation, heat, swelling, and pus occur.

4. Pus (an accumulation of dead bacteria and tissue cells). This accumulates in a closed wound and forms an abscess.

5. Abscesses become walled off with connective tissue to prevent extension of the infection.

6. Leucocytes (white blood cells) go to the wound site to prevent infection from spreading beyond the point of introduction. With any active bacterial infection there is almost always an increase of white blood cell count. The opposite is commonly seen with viral diseases.

In normal circumstances, most infections are stopped and disease is prevented but if the body cannot produce leucocytes because of malnutrition, a long term disease, or stress, then a condition called bacteremia or septicemia develops, in which case an antibiotic would be necessary.

Besides pus, eye secretion, droplets of moisture from respiratory infections, feces and urine can move the pathogens from the site of the infection. If the infection persists and gradually wears down the animal's resistance, the infection is termed chronic. If the animal's resistance is quickly lowered leading to the rapid growth of infectious organisms, it is called acute. In the case of acute infection death usually occurs. Proper disposal of the carcass by incineration or deep burial, and decontamination of the host quarter will destroy the majority of the pathogens. If this is not done properly, disease can be spread to healthy animals.

It is possible for an animal to live with the pathogen because either the animal cannot eliminate the pathogen or the pathogen cannot lower the resistance of the animal. With humans this is how people can live a long time with parasites and other types of infectious agents. If one or the other loses the upper hand the disease will spread or the animal will be cured.

Sometimes a disease is said to be arrested. This does not mean the animal is cured because it can be subjected to periodic flare-ups of the disease. In both man and animal some deadly organisms continue to live in the excretory organs after the disease has run its course. These infectious organisms are eliminated by what is called a carrier.

Convalescent Carrier:

An animal after surviving a disease is unable to rid its body of the organisms.

Immune Carrier:

An animal that is immune to a disease but possesses and eliminates the disease carrying organisms from its body.

Contact Carrier:

These are animals that are host to and eliminate highly deadly organisms which they have picked up from contact with another animal. The carrier is one of the great problems affecting the control of infectious diseases.

It may be easier to recognize and possibily treat a diseased animal but virtually impossible to detect a carrier.

MICROORGANISMS WHICH DO NOT CAUSE DISEASE (SAPROPHYTES)

1. Microorganisms in the rumen of ruminants help to break down cellulose to usable energy.
2. Utilization by ruminants of non-protein nitrogen, facilitated by microorganisms in the rumen.
3. Microorganisms useful in making cheese, yogurt, beer, wine, silage, and compost.
4. Microorganisms that are helpful in maintaining fertility of the soil.
5. Microbes that remove biodegradable waste.

MICROORGANISMS WHICH CAN CAUSE DISEASE (PATHOGENS)

1. Parasitic: they survive at the expense of the host.
2. Affinity for certain tissues (i.e., rabies attack the nervous system).
3. Differ in mode of action.
    a. Some invade and destroy body cells.
    b. Some produce toxins which are poisonous.
    c. Mycotoxins form molds in feed.
4. Some have affinity for some animal species but host specificity is not absolute. Certain diseases can be between different species of animals.

SPECIFIC

1. Bacteria

   a. One cell organisms which are members of the plant family.

   b. Some are harmless unless they show up where they do not belong (i.e., E. coli from the gut, if transferred to the urinary tract and bladder, can cause an inflammation of the bladder.)

   c. Classified according to shape and arrangement of cells.

   d. Classified by staining. Gram positive, or gram negative which indicates their susceptibility to drugs or antibiotics. (i.e., penicillin is effective only against gram +, or broad spectrum which is effective against both, usually, such as combiotic: a mixture of penicillin and streptomycin.)

VIRUSES

1. The smallest living organism known. Measured in millimicrons.

2. Parasitic: They must live in body cells where they grow and multiply, they contain no energy of their own.

3. They slip through tissue with little disruption and tissue reaction (unlike bacteria).

4. Pus or phagocytes are not a defense against them.

5. They usually are tissue specific. i.e., nerve cells, skin cells, etc.

6. They can make harmless bacteria the secondary invaders.

7. They can not be destroyed by antibiotics, control is difficult. Viruses can be prevented by vaccines but these are used very little because vaccines destroy body cells as well as the parasitic virus.

8. The first evidence of viral infection may be a fever which is protective because it disrupts the virus' environment. However, prolonged fever may have a detrimental effect such as dehydration.

PROTOZOA

1. Similar to bacteria , unicellular, microscopic, and capable of carrying on all life processes within a cell.
2. 15,000 to 20,000 known species.
3. i.e., malaria in humans and cocci in chickens.

RICKETTSIAE

1. Smaller than bacteria but larger than viruses.
2. They can cause intracellular infection.
3. Like viruses, they can live and multiply inside the tissue cell of the host.
4. Unlike viruses, they are sensitive to antibiotics and have a carbohydrate shell.
5. i.e., Q fever and Rocky Mountain spotted fever are both caused by them (zoonoses).

MYCOPLASMA

1. A virus-like organism.
2. They can be grown in a medium free of mammalian tissue cells.
3. They are sensitive to certain antibiotics.
4. i.e., CRD in chickens.

FUNGUS

1. Molds (multicellular), yeast (unicellular).
2. They can invade animal tissue to produce disease and produce potent toxins.
3. They can grow outside the animal in feed, producing toxins which are harmful to animal after being consumed. i.e., mycotoxicosis and aspergilosis.

PARASITISM (GENERAL)

1. They vary from a single cell coccidia to worms and insects.
2. They can be either totally dependent on the host animal for survival or independent part of the time.

3. The relationship of many parasites is commensalistic. That is, the parasite lives off the host without really harming it, because if it did the parasite will be homeless.

4. Some immune response is developed.

5. Knowledge of the life cycle can provide the opportunity for control without depending on drugs.

6. Parasite control through medication alone is a continuing expense without any lasting benefit.

EXTERNAL PARASITES

1. They damage or irritate the skin by nourishing on blood, skin, hair, feathers, or other body tissues.

2. They transmit disease by carrying certain organisms in their body which they transmit to the host while feeding or sucking blood. i.e., Rocky Mountain spotted fever from ticks to humans.

3. Parasites can mechanically transmit disease organisms on their feet, mouth, wings, etc.

TYPES OF PARASITES

1. Ticks

   a. They carry the most diseases of any type of parasite and cause considerable damage to tissues around the feeding site.

   b. This area susceptible to bacterial infections, anemia, loss of weight, and even death.

   c. Life cycle: egg, larva, nymph, and adult stages.

   d. Hard ticks (infest domestic/wild animals and humans). They require one, two, or three hosts for each stage to develop.

   e. Soft ticks infest birds, poultry, rodents, bats, some domestic animals, and man. They are multi-host ticks which feed intermittently while hosts sleep and then return to crack or crevasses to lay eggs.

2. Mites

   a. They cause mange, scabies, and ear cankers.

   b. Life cycle: egg, larva, nymph, and adults (2-3 weeks).

   c. Types: Sarcoptic mange mite and Domodectic mange mite (cause hair to fall out) and ear mange (frequently found in dogs, cats, and rabbits.)

3. Lice

   a. Two types: Biting (birds & mammals) and sucking (Mammals).

   b. These are capable of transmitting disease, loss of hair or feathers, blood loss, and making animal susceptible to other infections.

   c. Life cycle: eggs (nits), nymph, immature louse to adult. Eggs are usually glued to the hair shafts.

CONTROL AND TREATMENT

Insecticides in the form of dusts, dips, or spray.

1. You should be careful in using these because they are poisonous to man, animal, and environment when improperly applied.

2. You must know which insecticide to use for which animal, the recommended dosage, and the method of application. Also be familiar with where to apply it and how to prepare it.

3. In general, treat including bedding, feeding equipment (but not the feed or water), nest, etc.

4. If insecticides are not available, a mixture of edible oil and kerosene (2 parts to 1) can treat for parasites.

INTERNAL PARASITES

1. The degree of injury or damages depends on number, life cycle (where migration takes place in the host), and the degree of immunity developed by the host.

   a. They can cause wounds which allow bacteria to enter or cough, bronchitis (i.e., lung worms).

- b. They can prevent proper food passage (i.e., roundworms) or absorb food intended for the host (i.e., tapeworms).
- c. They can cause anemia or bloodclotting (i.e. hookworms or stronglyes)
- d. They destroy tissue (i.e., bladder worms).
- e. They cause irritation and itching (i.e., pinworms).
- f. They transmit disease and secrete toxins which destroy enzymes and red blood cells.

Resistance to parasites is dependent on an adequate diet because protein is needed for the production of antibodies and to feed the parasites while some temporary immunity is developed.

TYPES OF INTERNAL PARASITES

1. Direct life cycle - one definite host, i.e. roundworms where adult worm lays fertile eggs in the host.
2. Indirect life cycle - the parasite will spend intermediate life on one or more intermediate hosts, i.e., swine acquires lungworms by eating earthworms that have consumed lungworm eggs.

PREVENTION

1. Break the life cycle.
    - a. Rotate pastures where eggs may incubate.
    - b. Remove intermediate host, i.e., provide a sanitary environment (fly control).
    - c. Use good quality feeds.

TREATMENT

1. Drugs, deworming medicine which can be animal specific and parasite specific, i.e. piperazine for chickens to treat roundworm but ceca worms are treated with phenothazine.
2. Read and follow directions carefully because overdoses can be dangerous.

3. Most worm medicines are effective only against the adult stage, therefore animals should be treated a second time (2 weeks later) to remove immature larvae.

Non-living agents which cause disease:

a. Nutritional deficiencies are covered to some extent in the Introduction to Nutrition, especially the vitamin and mineral charts. For protein and energy deficiencies refer to pages 107-130 in Where There is No Doctor, by David Warner.

b. Toxins: posisonous substances. Upon entering the body they destroy tissues.

Types of toxins according to their sources:

a. Bacterial toxins; these cause diphtheria, tetanus, and botulism.

b. Zootoxina; these are produced by certain snakes, bees, and spiders.

c. Phytoxina; such as those produced by the castol bean plant, poisonous fungi of certain toad stools, and braken fern.

d. Poisons in metallic substances such as lead and arsenic.

IMMUNITY

1. It is the degree of resistance to any specific organism and it can be complete or partial.

2. Defense against viral infections relies heavily on immunity. Immunity is also involved in fighting larger pathogens such as bacteria but to a lesser degree.

3. Immunity is highly selective. That is, protection against one organism does not protect against another with very few exceptions.

IMMUNITY SYSTEM - How it happens

The body produces a protein called antibody which is modified and found in the globulin fraction of the blood (humoral antibody). This antibody is formed in response to stimulation by a foreign protein (antigen). The antigen - antibody reaction is the fundamental way in which pathogenic organisms are destroyed. This destruction is done physically or chemically by the antibody combining with the antigen. When the animal has antibodies in its tissues and fluids and sufficient blood to stop the growth and invasion of a pathogen it is said to have immunity.

WHERE IT HAPPENS?

The primary sites of humoral antibody development are the liver and bone marrow. In young animals the thymus gland also is a producer. Lymphoid tissues such as tonsils and lymph nodes play less clear roles.

Interferon is a different type of antibody which blocks the entry of a virus into target cells. The production of this antibody is more rapid and works locally at the site of the infection.

WHAT DETERMINES THE DEGREE OF IMMUNITY?

The production of antibodies depends on:

1. The number of organisms (antigens) at the time of invasion.
2. The strength of the invader (i.e., virulent vs. low virulent strains of viruses).
3. The condition of the animal at the time of the invasion (sick animal vs. healthy animal).

HOW LONG DOES IT TAKE?

In general it takes about two weeks for a protective level of antibodies to be produced either in response to infection or vaccination. For this reason, vaccinating after a disease appears in a herd or flock is usually of little value and possibly may be harmful if the vaccine is live. There are a few exceptions to this rule, depending on how fast a particular disease spreads in a flock.

TYPES OF IMMUNITY

Passive immunity - occurs without the active participation of the antibody production system of the immunized animal.

Two types of passive immunity:

Artificial:

Blood serum from an immune animal contains antibodies which, when injected into another animal, makes the latter immune.

1. Mechanical transfer of immunity done by man, therefore, artificial.

2. Recipient plays no part, therefore, passive.

3. Antibody, not antigen, is transferred, recipient's immune system is not stimulated. Immunity will last only as long as the transferred antibody lasts (which could be from two weeks to 6 months).

Natural immunity is transferred from mother to offspring. This is done via the colostrum. Colostrum or first milk contains twice the total solids of normal milk and an excess of globulin which contains the same antibodies as found in the mother's blood. This is very important because the newborns have not yet developed their immune systems to produce their own antibodies. The newborn is able to absorb the antibodies intact--but this ability diminishes after 24 hours, and digestive processes destroy the antibodies. It is important that newborn animals receive colostrum as soon as possible after birth even if by hand feeding.

Active Immunity:

Active immunity occurs when the animal itself produces antibodies in response to antigens. The duration of active immunity may range from several months to a life-time, depending on the stimulative effect of the antigen involved.

Two type of active immunity:

1. Natural: When the animal is exposed to the disease and fully recovers.

2. Deliberate exposure: Antigens given through vaccination.

ACTIVE AND PASSIVE IMMUNITIES CAN COMPLEMENT EACH OTHER

The mother passes immunity via colostrum to her newborn; thus immunity is being developed because of natural exposure and infection. But if the pathogen is still in the environment, the offspring will be exposed. The offspring will not get the disease, however, because of the passive immunity. But as this immunity wears down, active immunity will develop through exposure. This will provide the long term protection after the passive immunity is gone.

WHEN IS THE BEST TIME TO VACCINATE?

Because passive immunity might interfere with antibody development from vaccines, it is generally best to immunize permanently by vaccine after most of the maternal antibodies are gone. This is usually at about six months. If vaccines are given before this they are:

1. Usually a milder strain because an animal's immune system is not fully developed but the animal needs immediate protection.
2. Part of a booster series of a gradual immune process.
3. Given because the animal needs the vaccine because of a potential outbreak in the immediate area, possibly with an antiserum.

TYPE OF IMMUNIZATION VACCINES

1. Antiserum:

   Produced from whole blood from animals either exposed naturally or artifically to the disease. The antiserum contains a high percentage of globulin (the protein containing the antibody).

   Advantage: It produces immediate immunity when injected, so protection is provided very quickly (valuable when there is an epidemic in your area).

   Disadvantages:

   1. Duration of immunity is short.
   2. It does not stimulate immunity but merely passively transfers antibodies to the animal.

3. It is quite perishable, expensive, species specific, and needs refrigeration.

2. Bacteria

   a. Suspension of killed pathogen bacteria, usually produced in an artifical medium.

   b. Method of getting a specific bacterial protein (antigen) into the animal without causing disease.

   c. Effectiveness depends on:

      1) Antigenicity of the organism.

      2) The number of killed organisms in the bacteria.

      3) Quality of the manufacturing process.

   d. Immunity rarely lasts over a year, and two or more doses may have to be given to yield satisfactory protection.

3. Vaccines:

   a. This term is used for all immunizing agents but technically a vaccine is a product containing a living antigen.

   b. Most common vaccines are used against virus diseases in animal and man.

   c. Because viruses only survive in living tissue, production of vaccine is different from production of bacteria.

TYPE OF VACCINE

1. Modified Live Virus (MLV)

   a. Generally produce long lasting immunity.

   b. Because they are live they can cause illness.

   c. They are dangerous if given to weaker, stressed, diseased, or malnourished animals or those whose immune mechanisms are not developed.

   d. Use only when your animals are healthy.

e. Use during the stage in life where economic loss will be minimized if the animals get sick (i.e., give vaccine when animals are not in production).

2. Attenuated Vaccines are produced through a procedure in which the virus loses its virulence and capability of producing disease.

   a. Immunity is not as long lasting because the balance between antigenicity and attenuation shifts to the latter.

   b. There is less risk involved because the vaccine can not produce disease. It is not as hazardous to use.

3. Dead or killed virus vaccine

   a. Vaccine that cannot produce the disease but produces immunity.

   b. Degree of immunity less than attenuated or live virus vaccine.

   c. These usually have to be repeated every year to maintain a protective number of antibodies.

Vaccination is not a procedure which is 100% effective in preventing diseases. Vaccines fail when:

1. They are improperly manufactured.
2. They are not properly refrigerated.
3. They are exposed to sunlight.
4. They are used after the expiration date.
5. They are improperly administered.

These problems are magnified in developing countries. Other problems one might encounter are:

1. The dosages are geared for large flocks because the country imports vaccines from developed countries where large flocks are common.

2. Dumping of expired vaccines by manufacturers on Third World countries.

METHODS OF ADMINISTERING VACCINES:

1. Intramuscular (IM) injection.
2. Subcutaneous (SubQ) - under the skin between skin and muscle.
3. Ocular: through the tear duct to the respiratory tract (eye dropper).
4. Nasal (eye dropper)
5. Oral
6. In the drinking water.
7. By spraying/dusting (chicken houses) enclosed areas.
8. Wingweb (chickens) injecting by stab in the wingweb.
9. Feather follicle (chickens) using a cotton swab.
10. Painting the anus.
11. Intradermal: fine needle in skin (i.e., TB test).
12. Intraperitoneal: under the skin onto the fold of the abdomen (swine).

GENERAL SIGNS IN RECOGNIZING DISEASE

1. Sick animals usually isolate themselves from rest of flock or herd.
2. They look dull and are inactive.
3. They eat and drink less (this may be the first sign).
4. They grow slowly.
5. They produce less (eggs, weight gain, milk, & number of offspring).
6. Fertility may decline.

SPECIFIC SIGNS OF DISEASE

1. Diarrhea
2. Paralysis
3. Coughing
4. Sneezing
5. Wheezing
6. Inflammatory exudate on skin
7. Blood in stools

If possible, it is good to send live sick animals to a veterinarian with the history of the animal. Decomposed animals are usually of little diagonstic value.

ZOONOSES

Zoonoses are those diseases whose causative agents are transmitted naturally between man and animal.

1. Over 100 zoonoses are recognized through the world.

2. These diseases are usually chronic in animals.

3. The symptoms are similar in man and animal.

4. Very little man to man or man to animal transmission of diseases occurs.

5. Man is often the dead end of the infection.

Some example of zoonoses are:

1. Rabies (virus).

2. Q fever & Rocky Mountain spotted fever (rickettsial disease).

3. Brucellosis (undulant fever in man). - bacteria

4. Salmonellosis (bacteria).

5. Trichinosis (worm origin).

HAND-OUT #79b

This Poultry Diagnostic Guide is a compilation in chart form of basic information relative to diagnosis of disease problems in poultry occurring in the different age groups.

BROODING PERIOD (Day-old to 4 weeks old)

CLINICAL SIGNS	POSSIBLE CAUSES
Huddling near heat source	Low brooding temperature. Disease condition salmonellosis, coceidiosis, NCD, CRD, etc.
Diarrhea	High salt content of feed (normal level is 0.37%). If whitish diarrhea with mortality - salmonellosis or bacterial enteritis (coliform infection). If bloody with mortality - coccidiosis.
Panting or gasping	High brooding temperature. Poor ventilation, strong ammonia odor. Pullorum disease or respiratory disease - NCD, IB, CRD, aspergillosis and air sacculitis.
Sudden heavy mortality	Suffocation - poor ventilation. Food poisoning. Disease conditions such as coccidiosis, acute typhoid, cholera, salmonellosis, and wing rot. Poor stock.
Tremors/paralysis	Epideic tumor (AE). Vitamin E deficiency. Mineral deficiencies. NCD (usually following respiratory signs).
Drop in feed consumption	Stale or unpalatable feed. High brooding temperature. Disease conditions - CRD, NCD, IB, salmonellosis, etc.
Watery eyes/nasal discharge	Strong ammonia odor. Disease problems - infectious bronchitis, IB, and CRD.
Conjuctivitis	Strong ammonia odor. NCD.

CLINICAL SIGNS	POSSIBLE CAUSES
Paleness	Nutritional problem - poor quality feeds or faulty feeding. Coccidiosis. Wing rot.
Poorfeathering/poor growth/lack of uniformity	Faulty nutrition - check feed and feeding system. Subclinical infections. Overcrowding. Poor brooding temperature. Poor stock.
LAYERS/BREEDERS	
Paleness	Nutritional problem - poor quality feed or faulty feeding. Chronic coccidiosis. Blood parasitism, avian malaria, aegyptianellosis, or leucocytozoonosis. Crop mycosis. Marek's disease. Lymphoid leukosis.
Paralysis	Nutritional deficiency. Cage layer Fatigue. Marek's disease. Mechanical cause.
Watery eyes/nasal discharge	Strong ammonia odor. Disease problems IB, NCD, CRD, and coryza.
Gasping, tracheal rales	NCD, IB, CRD, coryza, and laryngotracheitis and fowl pox (wet type).
Sudden drop in egg production	Nutritional problem - abrupt change in feed. Stress condition - sudden change in weather condition, fright. Vaccination. Sulfa medication. Deworming. Acute disease problems - NCD, cholera, IB.
Soft shelled egg	High environmental temperature. Nutritional problem - calcium, phosphorus, vitamins A & D deficiency. Sulfa medication. Disease problems-IB, NCD, fowl cholera.
Poor egg production	Nutritional problem - faulty feeding, poor quality feed. Subclinical or chronic infections. Parasitism - external or internal parasites. Poor housing - overcrowding, poor ventilation. Poor stock.

SESSION TITLE: Mushroom Follow-up

SESSION #80 WEEK #5 DAY #28 (80-5-28)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-10:30 F

INTRODUCTION: SESSION OBJECTIVES

This session will allow the trainees time to return to the mushroom piles they made in session #52 week #3 day #17 to observe and harvest the results.

SESSION TITLE: Quiz III

SESSION #81 WEEK #5 DAY #28 (81-5-28)

PRESENTER:

CO-FACILITATOR:

TIME: 10:30-12:00 C

INTRODUCTION: SESSION OBJECTIVES

Agricultural training is nearly over and the trainees have been instructed in agricultural concepts, procedures, skills and have had a great deal of hands-on experience. To determine what trainees have retained a written quiz is used to assess some of their knowledge. The objectives of this session are:

- o To gauge trainee understanding of those agricultural concepts presented to date.
- o To measure trainee assimilation of information
- o To test and practice adaptation to the metric system

HAND-OUT:

READING ASSIGNMENT: Review hand-outs, readings and previous quizzes.

TECHNICAL VOCABULARY:

Ideas
Knowledge
Skills
Practical
Problem

To identify

SESSION TITLE: Native Chicken Production

SESSION #82 WEEK #5 DAY #29 (82-5-29)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Improved chicken varieties are beyond the means of most small farmers, while native chickens are found in most villages. By working to improve the quality of native chickens, rural incomes and nutrition will also improve. At the end of this session the trainees will better understand:

- The difference between native and improved breeds of chickens.
- How improved management and care can increase the size and quality of native flocks.
- The village method of chicken raising. (Trainees observe the coops and flocks of nearby villages.)

HAND-OUT: #82-a Native Chickens

READING ASSIGNMENT: Practical Poultry Raising, Pgs 31-39.

TECHNICAL VOCABULARY:

Chickens
Native chickens
Improved breeds
Meat
Growth
Costs (high, low)
Management
Disease resistance
Fighting
Housing, coops
Supplemental feed

Hens
Roosters
Chicks
Eggs
Production
Feed
Disease
Pecking
To improve
Waterers
Vaccine

Medicine
Wormers
To brood
Feeders
Brooder
To manage
Nest boxes
To incubate
To hatch
Socrates

HAND-OUT #82-a
NATIVE CHICKENS

These often scrawny birds running around every village in Thailand are a major source of protein for the poor. Villagers who cannot afford to buy meat, fish and eggs at the market, can have an adequate supply of protein if they raise a decent number of native chickens. In addition, those villagers with decent-sized flocks can sell their extra birds for pocket money. And in emergencies, 30 birds can bring over 1,000 baht. Unfortunately, many villagers don't have enough birds to eat chicken regularly.

COMPARED TO IMPROVED BREEDS

Growth rate -- Improved meat varieties have been carefully bred to convert high protein feed into meat very efficiently. Native birds are much less efficient converters and take much longer to grow. Also, the improved varieties have been selected for size.

Egg production -- Improved egg varieties have been selected for high egg production, as many as 220 eggs per year. Native hens, on the other hand lay something like 50-75 eggs per year. Clearly, native hens are not our best source of eggs. Instead, their eggs should be hatched out into chicks.

Cost -- The great benefits of improved varieties are matched by high costs. Costs for chicks, feed, medicine and equipment are generally too high for villagers to get involved. In addition, economics of scale make it impossible for small farmers to compete with the large operations (10,000 birds or more) found in and near cities. In short, poor people can't afford to raise the improved varieties. But they can afford native chickens. Most farmers already raise native chickens for close to nothing. As will be seen, if they slightly increase their investment (a few baht per bird), their return will be greatly increased.

Feed -- This is the major cost for improved varieties, largely because of the high protein content. Native chickens don't need as much protein and they can run around to find most of their food. Thus, feed is not a high cost item with native chickens.

Management -- Very careful management techniques have been developed for the improved breeds. They take a lot of time, training and knowledge. Most farmers do very little to manage their flocks, but would benefit from doing so. Still, native chickens require far less management than improved varieties and what they require is easily within the range of small farmers.

Disease resistance -- The improved breeds were developed in Europe and North America. They have little adaptation to Thailand. Although the diseases are pretty much the same here as in the West, environmental factors, particularly heat and moisture, are a complicating stress on the improved birds. Native chickens are better able to withstand such stress.

Disease losses -- Seemingly contradictory is the fact that disease losses are much higher for native chickens than for the improved varieties. The reason for this is that improved varieties better feed, cleaner water, closer attention, better sanitation and, most important, regular vaccinations and medical treatment. If all these things were done with native chickens, their losses would be less than with the exotic birds.

Pecking & fighting -- Imported chickens are far more docile than the natives and are generally raised in conditions that can control this problem. Native birds are raised with various ages and sizes running around together. Many chicks are pecked to death and larger birds grow more slowly while recovering from wounds.

BUDDY'S GREAT NATIVE CHICKEN PROJECT

Most Thai find the meat of improved varieties bland and soft. Thus, native chickens get a better price (by weight) than the imported birds. Since no one is raising native chickens on a large scale, the market for them is far from saturated. I believe that it is possible for villagers to expand their flocks to a size of 100 birds or more, which would allow them to eat a bird every day and have surplus to sell. Because native chickens are preferred to the mass produced improved breeds, this is the only way that small farmers can compete with the big producers.

For example: A farmer with 10 hens and 2 roosters should have 500 to 700 chicks hatched out every year, if the chicks are taken away from the hens a few days after hatching. It's possible to keep losses under 10% (instead of over 50%). Thus, 500 hatched chicks should produce around 400 birds for the family to eat and 50 for sale (over 2,000 baht). With good hens and management 750 chicks are attainable, producing 400 birds to eat and 300 to sell (over 12,000 baht--many farmers receive less than 1,000 baht/rai for their rice crop before subtracting expenses!!!). I think that these results can be achieved with an investment of less than 5 baht/bird. And farmers can make more money off their rice by feeding it to their chickens.

HOW TO DO IT

What I have to offer is a package deal. In this package are nine improved techniques. In some cases you can't do one without first doing another. Do a couple of them and you'll get better results. Do them all and you'll get great results. Here they are in the order that I've introduced them to my students and that they've been introduced to me by my students.

Improve housing -- Or in many cases, provide housing. Doors, walls and a roof that will keep the chickens in at night and dogs, thieves and children out. Floors that stay dry. Protection from wind and rain. Simple coops can be built under houses and rice storage sheds. Get the chickens into the coops every night and release them in the morning. Most losses to dogs and thieves occur at night. If all the birds get cooped up it's much easier to vaccinate and do other medical things.

Waterers -- One in the coop and others around the house for a clean water supply. Dry up the dirty puddles that chickens usually drink from. Use the waterer in the coop for medicine, antibiotics and wormers. Store bought, plastic waterers are worth the cost.

Feed -- Some people say that Thai chickens get all the vitamins and protein they need from scratch, and they are short on carbohydrates. Use broken rice to get the birds into the coop at night and out of it in the day time. Plant leucena fences for the birds to nibble on. Kitchen scraps are good.

Feeders -- If you're going to feed them in the coop you should use a feeder for the sake of cleanliness. A simple bamboo feeder is fine.

Vaccines -- This is the biggie!!! Diseases needlessly decimate native flocks. Vaccines are easy to find and administer. If you've done the above steps, vaccinating is a breeze. When starting out, individual farmers won't have enough chickens (at least 70) to vaccinate economically, so vaccinate in groups of 5-10 farmers. The more farmers who participate, the lower the chances of disease outbreaks. The big die-offs occur in April and October (when the monsoons change), so make sure you've vaccinated beforehand. If you do, the results will be spectacular!

Medicine -- The real scrawny birds lacking most of their feathers are probably that way because they've got worms. Worm 'em! That's what your coop and waterer are for. In times of disease you may want to feed antibiotics and other medicines.

Brooding -- Hens are stupid and don't know how to count. They do a terrible job of keeping track of their chicks, so if you leave the job to them a ten chick clutch will soon be down to five or less. Second, hens don't like the chicks of rival hens and will peck them to death (it only takes one good peck) if given the chance. Third, it's the mothers that teach the youngsters to fight. These are three good reasons to take the chicks away from their mothers are soon as possible. Make a brooder and brood the chicks for 3-4 weeks, much longer than that and they'll suffer from an inadequate diet. You can mix chicks from any number of clutches with no problems, as long as the age gap is no more than a few weeks. I've been told that a 2 month old cockerel, when put in with all the chicks, will become the leader. When the chicks are released after brooding in peace and safety, they can take care of themselves and won't fight among themselves. They'll behave as a flock and follow their leader, which makes them easy to control, coop up and manage.

let the hens nest in trees and other places where you can't keep track of what they're doing. Often, two hens will lay in the same nest box, which leads to fighting, which breaks eggs (don't forget that one egg should end up as a 40-50 baht bird)! Count and record the number of eggs in each nest and do so every morning. If the number of eggs increases by two in one day, guess what? The hens will stop laying when their nest has ten to fifteen eggs, which happens twice as fast when two hens share the same box. If this happens, take half the eggs and put them in another box. Do what you can to get one hen to move to that box. Keep track of how many eggs a hen laysg before she starts to sit on them and how many she hatches out. Make soup out of the hens who stop laying after only seven eggs or hatch out less than 85%.

Breed improvement -- Besides getting rid of lousy hens, you can get an improved breed rooster. Research is being done on this and the data isn't available yet, but the theory is that some desirable traits will be passed to the rooster's offspring, while disease resistance and good taste will be retained. Rhode Island Reds and Barred Rocks are recommended because of good growth and egg production. A note of caution--be careful how you introduce these roosters or they'll be destroyed by local bullies.

The above techniques have been used sucessfully by 15 year old students. In fact, I learned more from my students than they learned from me. What I did was get them thinking and trying new ideas. I'm sure that other things can be done and recommend that you try. If, in the course of this, you teach some people how to keep records and experiment, you'll have succeeded. You'll eat a lot of chicken dinners, too.

Buddy Larson
Ag Training-Thai 81

(See Practical Poultry Raising, PC Manual M-11 for further ideas, particularly Chapter 4.)

SESSION #83 WEEK #5 DAY #29 (83-5-29)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:00 C

INTRODUCTION: SESSION OBJECTIVES

Even though staff and trainees have individually evaluated training throughout, it is also necessary to do so in a large group and somewhat formally. Although not a great deal of time remains in agricultural training, there is still a chance to adjust the final two weeks. This evaluation will also assist staff members write their reports. The objectives of this session are:

- To evaluate the success of training, specify strong points and weak points and suggest modifications and improvements.
- To make suggestions for the remaining weeks of agricultural training.
- To allow staff and trainees to share opinions and feelings concerning training, so that everyone knows where everyone else stands.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

- Evaluation
- Feelings
- Opinions
- Suggestion
- To suggest
- To change
- To share
- To discuss
- To fulfill
- Objectives
- Successful
- Complete

SESSION TITLE: Maintenance

SESSION #84 WEEK #5 DAY #29 (84-5-29)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 F

Refer to Session 33-2-9 for details.

Week #6

PCV Visits and Break

Week #7

85	7	37	Pesticide Use Review	08:00-09:00	F
86	7	37	Maintenance	09:00-11:00	F
87	7	37	PVC Visits Follow-up	11:00-12:00	C
-	-	-	L/CC	13:30-16:30	-
88	7	38	Fruit Tree Propagation Follow-up	08:00-09:00	F/C
89	7	38	Introduction to Demos	09:00-12:00	F/C
-	-	-	L/CC	13:30-16:30	-
90	7	39	Demo Preparation	08:00-10:00	C
91	7	39	Swine Selection	10:00-11:00	F/C
-	-	-	L/CC	13:00-16:30	-
92	7	40	Co-workers and Helping	08:00-10:30	C
93	7	40	Pig Diseases	10:30-11:30	F/C
-	-	-	Open	11:30-12:00	-
-	-	-	L/CC	13:30-16:30	-
94	7	41	Communication Skills	08:00-10:00	C
95	7	41	Ajaan Yais I	10:00-12:00	C
-	-	-	L/CC	13:30-16:30	-
96	7	42	Demo Presentation (English)	08:00-10:00	C
97	7	42	Swine Reproduction	10:00-12:00	F/C

SESSION TITLE: Pesticide Use Review

SESSION #85 WEEK #7 DAY #37 (85-7-37)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:00 F

INTRODUCTION: SESSION OBJECTIVES

This session is to follow-up and review what was covered in Session 63-4-22: Mixing and Applying Pesticides. Trainees should decide, on their own, whether or not to spray and, if spraying is necessary, what to spray.

HAND-OUT:

READING ASSIGNMENT: Review Session #63-4-22

TECHNICAL VOCABULARY:

SESSION TITLE: Maintenance

SESSION #86 WEEK #7 DAY #37 (86-7-37)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-11:00 F

INTRODUCTION: SESSION OBJECTIVES

This session should include the final clean up and harvesting prior to Field Day preparations, with focus on cleaning the community plots.

SESSION TITLE: PCV Visits Follow-up

SESSION #87 WEEK #7 DAY #37 (87-7-37)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

The trainees have just returned from the PCV Visits. Each one of them has seen a different situation and it is important for them to share their experiences for several reasons. They will have a better picture of the program they will be working in and will be able to better formulate reasonable strategies for site entry. This session is a transition from earlier General Program (GP) Sessions--in which information was presented to them--to the remaining GP Sessions in which they are expected to provide the bulk of the information. The objectives of this session are:

- To share general impressions of the PCV Visits.
- To compile lists of points to discuss in later GP and PS sessions, such as: PCV lifestyles, PCV work roles, interesting stories, successes, problems and PCV emotional states.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Fruit Tree Propagation Follow-up

SESSION #88 WEEK #7 DAY #38 (88-7-38)

PRESENTER:

CO-FACILITATOR;

TIME: 8:00-9:00 F

INTRODUCTION: SESSION OBJECTIVES

This session is for the sole purpose of returning to the fruit tree nursery to follow up on the results of the previous Session #52, week #4, day #21, i.e. to check the grafts.If there were problems with the grafts, technical trainers will try to explain.

SESSION TITLE: Introduction to Demonstrations

SESSION #89 WEEK #7 DAY #38 (89-7-38)

PRESENTER:

CO-FACILITATOR:

TIME: 9:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Knowledge of agriculture alone is of little use to PCVs. They must be able, in spite of language and cultural obstacles, to communicate their knowledge with students, farmers and co-workers. Each trainee must develop and practice this ability. Demonstrations are a very useful communication tool that allows PCVs to overcome some of the obstacles. The objectives of this session are:

- To develop ideas about demonstrations and what makes one good or bad.
- To show 3 kinds of demonstrations: method demo, scale-model demo and result demo.
- To prepare trainees to do their own demos.

HAND-OUTS: #89-a Points to be covered during the session.
#89-b The Use of the Method Demonstration
#89-c The Result Demo Plot

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To demonstrate	Method demo
To communicate	Scale-model demo
To evaluate	Result demo

HAND-OUT # 89-a

POINTS TO BE COVERED DURING THE SESSION

I. PREPARATION

- A. Choosing a topic
  - 1. Is the farmer ready to use the improved practice?
    - a. Are materials available?
    - b. Are there other things that are more important?
    - c. Are there any factors which might prevent the practice? eg. cultural, religious.
  - 2. Does the farmer need the practice?
    - a. Is it an improved practice?
    - b. Can farmer readily put it into practice?
  - 3. Can the farmer afford it?
    - a. What materials need be bought?
    - b. Is there any way to reduce cost?
      - 1) Local materials?
      - 2) Sharing of costs between farmers?
      - 3) Grants or loans?
  - 4. Can the farmer learn it?
    - a. Physically possible?
    - b. Does the farmer have the background knowledge?
  - 5. Demonstrate one thing at a time?
    - a. Will you need more than one demo session?
    - b. Is the topic too broad, too complicated?
  - 6. Research?
    - a. All available information?
    - b. Anticipate questions.
  - 7. Title?
    - a. Does it convey what will be done?
    - b. Is it a catchy title?
  - 8. Timeliness?
    - a. Is the demo to be just before that type of work is to be done?
    - b. How soon before?
- B. Set-up
  - 1. Arranging the time
    - a. Convenient for the farmers?
    - b. Holiday or regular work day?
    - c. Morning, afternoon, or evening?
  - 2. Arranging place?
    - a. On one of the local farms?
    - b. Convenient location for all?
    - c. Is transportation to be provided?
  - 3. Physical arrangements?
    - a. Will everyone be able to see your actions?
    - b. Will everyone be able to hear?
    - c. Space provided for people to practice?

4. Materials?
    a. What will you need?
    b. Are the materials available?
    c. Have the materials long before hand?
    d. Will you provide practice materials for the farmers?
5. Practice?
    a. How smoothly will the demo go?
    b. Will you be lost for words?
6. Will the demo relate to the audience?
    a. Can you relate to the farmers' experiences?
    b. Is there anyone present you can ask for examples?
7. Did you write down each step?
    a. Do you have enough time for each step?
    b. Can you divide more difficult steps into easier ones?
    c. Will you be able to follow your plan?
    d. Can you change your plan easily in case of unforseen circumstances?
        1) Rain
        2) Illness
8. Are your instructions written in a simple, understandable manner?
    a. Is the vocabulary that of the area?
    b. Do the instructions include all necessary steps?
9. Publicity?
    a. Did you use posters to advertise?
    b. Did you remind people?
    c. Was your last demo the talk of the town?
    d. Advertise your next meeting?

C. Considerations during the demo.

1. Did you present the demo with enthusiasm?
2. Did you act?
3. Did you talk to (not at) your audience?
4. Was the demo explained step-by-step?
5. Are you certain they understood?
6. Was there time for questions?
7. Did you repeat steps as necessary?
8. Did you assist the slower persons?
9. Were faster persons used to assist?
10. Were important steps summarized?
11. Were final questions encouraged?
12. Were hand-outs distributed at the end of the demo?
13. Was the audience told where to get additional help if necessary?
14. Was a list of attending farmers made?
15. Were there any conflicting meetings?
16. Were photographs taken?
17. Were records kept for future reference?
18. Were credit and recognition given to farmers for their help?

II. Demonstration
- A. Choosing the type of demo.
    - 1. Scale-model.
    - 2. Result demo.
    - 3. Method demo.
- B. Scale-model
    - 1. When used?
        - a. Illiterate people.
        - b. People unfamiliar with conventional Western concepts.
        - c. To show results.
    - 2. Serve as communication aids in the following contexts:
        - a. Mapping 3-D relief features.
        - b. Showing relationship between system's parts.
        - c. Replicating to scale a mechanical part that can be manipulated and used for practice.
        - d. Planning.
        - e. Promotion of innovations.
        - f. Problem solving.
        - g. Comparative analysis.
    - 3. Planning considerations
        - a. Choice of scale.
            - 1) Large or small.
            - 2) How small?
        - b. Choice of materials.
            - 1) Cost
            - 2) Availability
        - c. Permanent or temporary construction.
        - d. Rain protection, shade.
        - e. Accessibility, suitable for audience size.
        - f. Capable of being manipulated.
        - g. Culturally acceptable.
            - 1) Certain colors.
            - 2) Replication of human forms.
- C. Result demo
    - 1. When used?
        - a. To show results of research or testing.
        - b. For long-term concepts.
    - 2. Select practices according to
        - a. Local testing
        - b. Affordability
        - c. Profitability
        - d. Showing immediate results
        - e. Suitability to prevailing cultural patterns
    - 3. Need not be run by extension agent
        - a. More credibility with local farmer.
        - b. Testimony of farmer.
    - 4. The farmer
        - a. Should not be too wealthy or progressive.
        - b. Should not give undue care to plots.
        - c. Results shown should be normal conditions by normal farmers.

5. The plot
    a. Typical of surrounding lands.
    b. Crop must be managed at realistic levels.
    c. Who will provide necessary input?
        1) Ideally, the farmer.
        2) Some instances where the extension service might provide inputs as a courtesy to the farmer.

            a) Will a gift of inputs have a negative effect on the agent-farmer relationship?

            b) How will other farmers perceive the gift?
    d. Location
        1) Conspicuous or readily noticeable.
        2) Along road or footpath.
        3) Traditional and improved plots
            a) Meet local literacy rates.
            b) Local tradition.
    e. Size factors
        1) Labor constraints of farmer.
        2) Amount of land available.
        3) Size of group observing final result.
        4) Type of crop.
        5) Overall impression the demo is to create.
        6) Large enough so both traditional and improved plots can be seen at a glance.
        7) Some suggestions.
            a) 100-200 sq m for field crops.
            b) Less area for vegetables.
6. The process
    a. The farmer must be familiarized with what, why, when, and how of the project.
    b. Extension agent must see that all inputs are done on time.
    c. Accurate documents.
        1) Rain and temperature.
        2) Fertilizer
        3) Etc.
7. Again the farmer
    a. Must be thoroughly trained.
    b. May provide testimony.
    c. Opportunities early on to show progressive results.
8. The presentation
    a. Farmer may help agent in
        1) An explanation of new practice focusing on amount of labor, materials, and changes from traditional methods.

        2) Conservative estimate of costs and returns.
        3) Question and answer period.
        4) An offer to follow-up visits to other farmers interested in adopting new methods.
      b. May take the form of a method demo.
      c. Encourage active participation.
      d. Prepare a written plan.
      e. Pose questions at regular intervals to see if audience is understanding.
  D. Method demo
  See points to consider at beginning of outline.

III. Follow-up
  A. Evaluation
    1. If it was a good demo, farmers should know how to do the practice presented.
    2. Are they adopting the new practice?
    3. If not adopting it, reasons?
      a) Too difficult
      b) Too costly
      c) Untimely
      d) Poorly planned
      e) Not needed.

HAND-OUT # B9-b

THE USE OF THE METHOD DEMONSTRATION AS A TEACHING DEVICE

Principles of learning as applied to the method demonstration:

A method demonstration is an organized system of teaching people how to do a practice or skill. it has been used in many countries since extension first came into existence. The basic principle of the use of this method of teaching people is that the people are taught a skill one step at a time. It has long been known that people learn more, retain more and learn faster if the information being taught is presented in definite, clear-cut steps, where each single step advances the learner one stage nearer to the completion of the skill.

The sense of hearing:

The method demonstration requires a teacher and a learner. This requires a teacher who understands how people learn. An understanding of how the senses are employed in learning a skill is basic for the ability to teach. The sense of hearing plays a very useful and important role in learning, but it can easily be pointed out that learning certain skills can take place without the use of this sense. A deaf person can be taught to do most tasks except those requiring the use of the ear to do the job. People have been taught rather complicationed skills where the teacher and the learner had no common language ability. Thus, the sense of hearing is not absolutely essential for some forms of learning. About 10% of the skills we learn are attributable to the use of the ear.

Hearing has limites in learning:

Imagine how limited your learning would be if hearing was the only one of the five senses you possessed. It is almost impossible for a person to tell another how painful it was when he broke his arm. Could you tell another person the difference between paraffin and petrol? There are more effective methods of teaching than by just telling.

The sense of seeing and learning:

There is evidence to support the argument that the use of the eyes is not absolutely essential to learning, but admittedly, sightlessness is a far greater handicap here than deafness. About 35% of the skills we learn are accomplished through the use of the senses of hearing and seeing. These are not hard and fast figures since individuals vary ly inthe use of these senses. It is definite that the conbined use of the two senses serves the learner to greater advantage than the use of them separately.

We learn skills best by doing:

There is only one way of knowing that a skill has been learned, and that is when the teacher actually sees the learner doing the job tht is being taught. The use of the hands (doing), along with the application of hearing and seeing, increases our effecitveness in learning a skill. 75% of all skills learned make use of the senses of hearing, seeing and doing. Some skills may require the sens of taste and smell.

We use our sense of taste to determine when milk is souring. We use our sense of smell to distinguish between paraffin and petrol. Obviously the limitations of the use of these senses arise from any danger coming from this activity. We do not identify poisonous insecticides by taste, nor do we detect poisonous gases by smell.

THE METHOD DEMONSTRATION

Your subject must be timely:

Before deciding what you will demonstrate, it is a sound practice to be certain the subject meets a few basic requirements. This can be determined by asking yourself first: Is the subject timely? It is not time to demonstrate coffee pruning before the tree is planted. It is not time to demonstrate maize harvesting when it has just been planted. It is not timely to teach farmers how to operate tractors when they do not own them, and may not for a long time.

The farmer must need the skill:

The next question to ask yourself about the subject is: Does the farmer need this skill? The fact that you feel the farmer needs to be taught a new method has little bearing on the farmer's opinions. You can say the farmer needs a skill when he has so decided for him/herself. If you cannot convince the farmer s/he has a real need for the subject you plan to demonstrate, perhaps it is not time to attempt to demonstrate it.

If the farmer cannot afford it, don't teach it:

The third question is: Can the farmer afford it? Again, if the farmer does not believe s/he can afford it, s/he will not adopt your practice. It is only when s/he can be convinced that s/he cannot afford to farm without adoptinng your practice that s/he will ask your help to learn to use the information.

The materials must be available:

There yet remains another question: Are the materials available? It is of little use to select the subject of a new hybrid maize to be planted if the seed is not available.

How to use the method demonstration:

The questions asked above about the subject to be demonsttrated seem to be elementary, but many a demonstration has been doomed to failure before it was started, simply because one of these questions could not be answered "Yes." It is also helpful to think of a demonstration from the standpoint of three phases, or periods.

1. Before the meeting
2. At the meeting
3. After the meeting

Careful planning is required for each.

Before the meeting:

In setting up the time for a demonstration, we are not only to think of the hour, the day, the month and the season. There are other considerations about the time. It would not be a good time to give a demonstrattion when you would run into competition with another meeting, or perhaps a visit to your area by a V.I.P. Such competition would be difficult.

Select the site:

In regard to a place for a demonstration, the important thing is to be certain tthat you have a satisfacgtory site at which to hold it. The key point for each consideration in planning a demonstration is to plan ahead. You can be sure to have a site arranged if you take the matter up well ahead of time. Should you request a farmer to use his shampa to hold a maize planting demonstration, it would be disappointing to learn he had already planted his maize the day before.

Use a title which attracts an audience:

Selecting a title which has an appeal is not always an easy job, but it deserves thought. You select a book by its title, or a magazine by its articles. A farmer may be attracted to a demonstration by a title which appearls to him or her, or s/he may not attend because it failed to arouse an interest. If you study your audience you can better know what appeals to their interests.

Teach one thing at a time:

Your plans should be made to teach the farmer one thing at a time. You will only confuse the issue if you try to cover the entire area of coffee culture in one demonstration. S/he will remember most of the details about one phase of coffee culture, but s/he may forget several vital points made at a demonstration given on planting, pruning, mulching etc. Plan to teach one thing during one demonstration. It is best not to divide a farmer's interests between several phases of an enterprise, yet a demonstration must provide a challenge to the farmer if s/he is to consider it worthwile to attend.

Watch your language:

The language to be used at your demonstration may well spell success or doom to your performance. Language is not referred to as meaning only the vernacular you will use, but even more important is the hcoice of words. Plan to use language at the level of your audience's ability. People are not impressed by big words. Why say "di-chloro-di-phenyl-trichlor-ethane" when you mean D.D.T.? The farmer may not even had heard of D.D.T. in which case it would be wise to refer to it as a "medicine" called D.D.T. Aristotle said: "Think like a wise man, but speak in the language of the people." It is the best assurance that you will be understood.

Relate to experience:

Whenever possible relate to experience of peopl One example of this was heard at a demonstration. In placing fertlizer in a ring around the base of a coffee tree, the demonstrator was asked why he did not simply put the fertilizer in one pile. He was able to relate to experience as follows: he referred to the roots of the tree as the mouth of the tree and said: "when you want food you put food to your mouth. Fertiizer is tree food, Put the fertilizer to the mouth of the tree--the roots." The farmers understand this kind of talk because it relates to every day experience. The farmer who has lost a large part of his crop to insect damage fully understands the economic importance of a recurrence. Make your comparisons relate to the past experiences of your audience.

Have everything ready:

Embarassing mements may come about at your demonstration because you failed to include an item. You may not be able tto get a particular item if you wait till the last minute. It is possible that the last can of DDT was sold the day before. Plan well ahead to have materials on hand.

Be ready for questions:

Research will assist you to answer the difficult questions asked at your demonstration. Even then someone will ask a question you had not expected. Gather as much subject information as possible before you give your demonstration. When you are asked questions for which you have no answer, tell the person you do not have an answer and that you will find it and give it to him another time.

If you give misinformation, you will soon be found out. You cannot afford to lose prestige by giving incorrect information.

Practice:

You will avoid making embarassing mistakes if you will practice your presentation ahead of time. Practice until you beocme an expert at the skill you are demonstrating. Practice makes perfect. Become a perfectionist.

Outline your plan:

The purpose of this whole exercise is to get the demonstrator to develop written plans. Written plans help a demonstrator stay on the subject. They help him to give the demonstration with greater certainty and proficienty. A good plan causes the demonstrator to complete his demonstration without omitting any steps or key points and to give the same information at each similar demonstration in his location. The strongest support for written plans is that when they are used as guides, each step is given in its logical order. A step is an action by the demonstrator that brings the job being demonstrated one phase nearer to completion. A key point is informattion which prevents a step from being improperly done, or that might otherwise ruin the job. An example of a step is: ad two ounces of DDT liquid to four gallons of water. The key point for that step would be: Stir the "medicine" and water to assure a uniform mixture. Unstirred, the mixture would fail to do the job.

At the meeting:

We have been thinking of all the things to do before the meeting. Long time planning ahead is the only known method of preparing for the day of the meeting.

Plan ahead:

On the day of the meeting you should have everything you will need ready to go. All necessary materials should be checked before leaving your home or office so that nothing will be forgotten. You should plan to be at the demonstration site at least 20 minutes before your audience arrives. This will allow you time to arrange your materials in their logical order for the demonstration. Plan for audience comfort. Plan to arrange them so that they can see every action on your part. Demonstrations during the hot weather, when tthe sun is at its peak are uncalled for and show poor planning. Plan for a cooler part of the day. At the meetinng you must show enthusiasm while presenting your demonstration. If you do not appear to be interested and convinced in what you are saying, it is quite likely that your audience will not show interest either. Act yourself. Appear relaxed during the demonstration, if you have confidence in your ability this will come naturally. Talk to your audience at all times. There is a difference between talking "to" an audience and talking "at" them. An audience being talked to is aware of it. They can feel that they are part of the discussion. Avoid talking to one individual for any length of time. You can soon lose your main audience with such methods. Each member should be made to feel that youare talking to him/her.

Question techniques:

Your audience should be made aware of each step as youpresent it. They should not only clearly understand justt what it is you are showing them, but shuld also clearly understand the importance of the step to the total demonstration. The questioning technique can often be used to determine if you are being clearly understood. If you will also allow and encourage the audience to ask questions you will find it a useful means of noting your effectiveness in being understood. Each time one of your audience asks a question, repeat the question before you give an answer. First, it assures that each of your audience had an opportunity to hear the question. Secondly, it gives you time to organize your thinking and give a sound answer. Most people will not ask to have you repeat the question even though they may have been interested. Some demonstrators use the technique of having a member of the audience demonstrate his ability to perform a step to give confidence to the group. If one of them can do it, there is less doubt about their own ability to perform what is being demonstrated.

Repeat steps whenever necessary:

In testing members of the audience you may find it is necessary to repeat a step. This is considered to be a good teaching technique. Let no one leave your demonstration unable to carry it out at home.

Watch for the faster and slower learners:

Some members of your audience may be faster in learning the skill than others. When the audience is doing the demonstration, faster learners may be used to teach or assist the slower learners. Use this technique whenever practical.

Give a summary:

A brief summary of what you have been demonstrating before you close helps to refresh the audience and sends them away with the sequence of the steps in their proper order. This period also serves to give last minute warnings of any dangers or hazards to avoid. After your summary, encourage any final questions so that none may go away not knowing. Advise them where and how to get further assistance if needed.

Don't fail to advertise your next meeting:

Extension workers should take advantage of every group at a meeting or demonstration to announnce the next meeting. Even though yur next meeting may be on quite a different subject, there is the possibility that some of the audience may contact people who will be interested. If it is to be related to the present demonstration, do not fail to announce that the next meeting will be one further step toward the total job. Remember, your present audience gives good promise of being your audience in the future, if you are giving a good, well-planned demonstration today. As a parting shot, you may have materials to hand out for today's demonstration, or a short comment about the coming meeting.

Follow up after the meeting:

Although your demonstration is over for the day, it is not finished. Extension work requires continued evaluation. your follow-up serves several purposes, one of which is an evaluation of your effort. If you have put on a good demonstration the farmers should know how to do it. If you have convinced them of the need for practising the skill you taught them you can expect them to do it on their own farms. If they do nothing to use the practice, the matter needs to be investigated. All of these things are included in the follow-up.

It is not enough that you have taught the farmer how to do a practice, s/he must be movitated to carry it out on the farm. If s/he has not adopted it, it may have been:

- too difficult
- too costly
- untimely
- poorly planned
- not needed

Any one of the above situations is reason enough for failure to adopt. Check the farmers so you can check yourself. Determine your short-comings. Correct them and avoid future failures.

PLANNING A METHOD DEMONSTRATION

1. Demonstration title: Garlic Onions are Easy to Grow for Food and Profit.

2. Why is this demonstration important to your audience?

   a. Garlic onions are a new crop in this area.
   b. Garlic onions grow easily.
   c. Garlic onions provide a good food addition for the home.
   d. There is an avilable market for a good crop of garlic onions.

3. Materials needed for this demonstration:

Equipment and supplies:

(1) planting plot
(2) hoe
(3) hand rake
(4) Pegs
(5) One "oil tin" full of well rotted farmyard manure
(6) Stick, one foot long
(7) Stick, four inches long
(8) String
(9) Garlic onion bulbs.

Visual Aids and Hand-outs

(1) Pamphlet on "Planting Garlic Onions" in host-country language, with many drawings, if possible.

(2) Sample onion bulbs

4. Presenting the Demonstration

	STEP-BY-STEP ACTIVITTIES	KEY POINTS
I.	Mark out the first row.	Use a string and pegs to mark the row; make sure the string is tight.
II.	Measure second row one foot from first row.	Use stick 1' long to measure spacing.
III.	Additional rows are laid out at same spacing.	Keep rows straight using string and pegs.
IV.	Make the planted furrows 1" deep.	Use hoe to dig furrows along the line of the string.
V.	Place farmyard manure in furrows to the level of the ground.	Use well-rotted manure.
VI.	Mix the manure into the furrow soil.	Prevents burning of the bulbs.
VII.	Mark the planting spaces along the furrow.	Use 4" stick to lay out spaces.
VIII.	Plant the bulbs at the 4" spaces in the furrows with the point of the bulb up.	Bulb point must be up. Firm soil around each bulb.

5. Summary of points made during the demonstration:

   (1) Garlic onions can be planted during the long and the short rains.

   (2) The planting space is 4" between plants in the row and the rows are one foot apart.

   (3) Furrows are dug and filled with well-rotted manure to the level of the ground.

   (4) The manure is mixed in the furrows with the soil.

   (5) A single bulb is placed at each 4" space in the furrow.

   (6) The point of the bulb is upward.

   (7) The soil is firmed around the bulb for fast germination.

6. What are the people expected to do as a result of this demonstration?

   The farmers are expectted to plant garlic onions properly for an easy csh crop.

7. Plans for follow-up and testing the effectiveness of the demonstration.

   (1) Visit the farmers who will plant onions and assist them as necessary.

   (2) Visit again before harvest time to assist them with marketinng their crop.

From: Agricultureal Extension Training: A course Manual for Extension Training Programs, by J. D. Fisher, R.A. Wesselmann, and others; USAID Kenya; 1968: Reprinted April 1970 I.C.E., Peace Corps; Washington pp. 9-16.

HAND-OUT # B9-c

THE RESULT DEMO PLOT AS AN EXTENSION TOOL

I. WHAT IS A RESULT DEMO PLOT?

Designed to provide farmers living proof of the benefits of new practice or package of practices; it's actually two plots (improved and traditional) compared side by side.

II. RESULT DEMOS AND THE RESEARCH-EXTENSION CHAING.

Developing and testing new practices vs. promoting them; where do result demos fit?

A quick look at the Research-Extension Chain:

Pure Research -- Biological Sciences
Basic Research -- Agricultural Sciences
DEVELOPING Applied Research
ADAPTIVE RESEARCH: "Customizing recommendations to local agro-environments

Small plot tests at national and regional experiment stations using promising leads of applied research.

AND

On-farm experiments: The "best bet" practices derived from the small plot trails are tested at various levels (rates, etc.) and in varying combinations under on-farm conditions. Due to their complexity and need for precision, they should be supervised by researchers and assisted by extension workers.

TESTING

On-farm result tests: The most promising practice or "package" is tested for profitability by extension workers and farmers under actual farming conditions. This is the "acid test" of suitability.

EXTENSION

PROMOTING
Result demonstrations (or Result-Method Demos)
Method Demos
Other extension tools
Farmer Feedback & Adjustment of Recommendation

Researcher Extension Workers Farmers

Promoting practices without adequate testing is a common syndrome among PCVs and extension workers. No wonder farmers often appear to be resistant to change.

III. HOW TO SET UP A RESULT DEMO PLOT

1. Select an appropriate practice or "package" to demonstrate.

    a. Given your lack of local experience and ttime to adequately ttest practices, *rely on the local extension service* to provide appropriate choices: *always check to see if adequate local testing has been done:* the amount needed will vary with the practice; i.e., selecting an adapted improved crop variety requires much more lengthy local testing than the use of mulch or insecticides.

    b. *One practice vs. a package:* Although a package may be more complex and cost more, it may be the only way to achieve good enough results tointerest farmers. A well designed package actually reduces farmer risk.

    c. The practice(s) chosen should be *affordable, adapted, and profitable* for the majoritty of farmers in your area. Extension services tthat really have their act together may divide tthe region's target farmers into several *recommendation domains*, each with an adjusted package to reflect variations in soil, topography, economic circumsttances, etc.

    d. *Gestation period:* At least in areas where extension efforts are relatively new, practices that produce results in weeks or months are more likely to be readily accepted than those requiring longer periods.

2. Select a cooperating farmer (or organization)

    a. *Don't run the demo on your own land*. Farmers are most impressed by the results obtained by other farmers, not by a PCV or ag agent.

    b. *Choose key farmers* who are influential but not necessarily the best or most progressive, since they may be regarded as eccentric or as favored pets of the extension service.

    c. Group demos on rented lang are OK, but the group should be a preexisting one (like a co-op) rather than one specially organized for the demo.

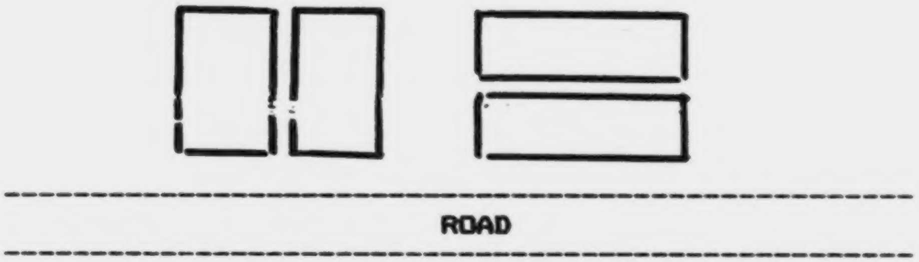
    d. Since the farmer or farmer's group should do most of the actual work (this makes the demo credible), be sure that this is understood. This brings up the question of whether the inputs should be donated or charged for.

3. Choose a suitable location and layout.

   a. Site Criteria: A conspicuous location with good exposure like near a road or trail. The land and soil should not be atypiclly favorable or unfavorable but representative of target farmers' situations.

   b. Size: Large enough to be realistic but not so big that it's difficult to visually compare the traditional and improved prractice plots side by side. A couple hundred square meters per plot would be adeauate for a maize demo, with less area sufficing for more intensive crops like vegetables. it's also easier tofind cooperative farmers if tthey know that the plots will be small, thus minimizing any perceived risk.

   c. Plot layout: Decide the best way to show off the demo tto an audience, plus consider audience size. A side by side layout is better than a front and back layout



   It's usually best if the rows run front to back rather than parallel to the viewing area. TThis makes it easier for farmers to enter the plots.

4. Provide adequate supervision of the demo.

   a. Both the extension worker and the farmer need to be thoroughly familiarized with the what, why, when and how of the various operations involved.

   b. Make sure the needed inputs are on hand.

   c. Make sure that the inputs and otther practices are correctly applied on schedule.

   d. Avoid the tendency to favor the improved practices plot by giving it an unrealistic amount of TLC.

   e. Keep accurate records, including rainfall which will help analyze the success (or failure) of the demo.

IV. PROMOTION AND FOLLOW UP

1. At what stages will tthe demo produce visible results worthy of farmer attention? i.e. only at harvest or at earlier stages too (like color and plant size difference).

2. Arranging farmers visits.

   a. Unsupervised, unscheduled "stop by anytime" visits: Need explanatory signs in writing and with pictorial explanations for those who can't read. This type of visit should only be a supplement to supervised visits.

   b. Supervised, scheduled visits conductted peridically at key stages. Since new practices usually require a combination of explanation and instruction, a combined rresultt-method demo may be appropriate. However, don't co farmers being convinced enough to try the new practices even by the timesucessful demo reaches harvest stage. Also, farmers may not be able to apply the practices till the next cropping season.

      It's often appropriate tto schedule separate method demos at a later date (i.e. even well afgter the result demo). Such method demos should be timed to coincide with the crop's actual production cycle and may involve several staggered method demos so that farmers can learn the new methods within a month or less of having to apply them.

   c. Any result demo scheduled visit session should provide farmers with realistic cost-return date for the practices. Researchers and extension workers tend to exaggerate the claims and benefits of a new practice. Be conservative yet realistic. Remember that a typical result demo is small scale and therefore more pampered then when farmers implement the methods on larger fields.

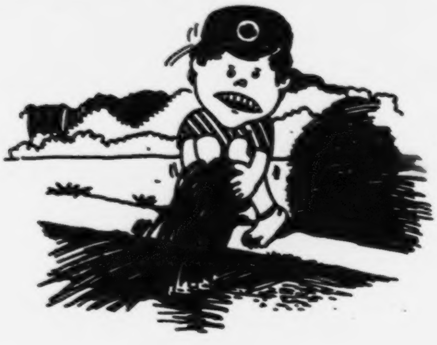
V. WHAT ABOUT THE "SPONTANEOUS" DEMO?

A spontaneous Demo is a very effective type of demo using a farmer's field that already demonstrates the benefits of what you're trying to promote. One advantage of the spontaneous demo is that itt escapes the possible stigma of appearing contrived like a purposely organized result demo.

วิธีทำกองเพาะให้ปฏิบัติตามขั้นตอนดังนี้

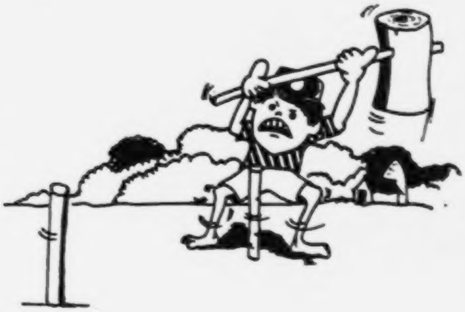
#1

ก. แช่ฟางในน้ำจนนุ่ม (ตอซังถอนแช่นาน 5 นาที ตอซังเกี่ยวติดดิน แช่ทิ้งไว้ 1 คืน)



#2

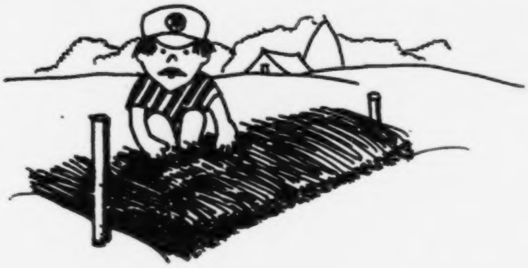
ข. ปักหลักไม้ 2 อัน ห่างกัน 4–6 เมตร (เท่ากับความยาวของกองเพาะ)



#3

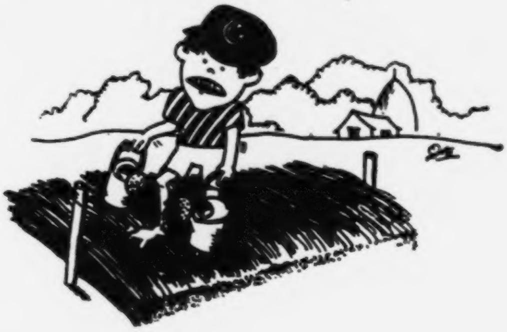
7

ค. นำฟางที่แช่น้ำจนนุ่มแล้ว มาวางเรียงระหว่างไม้หลัก ให้โคนตอซังชี้ไปทางเดียวกันทั้งหมด แล้วเกลี่ยฟางให้หนาเท่า ๆ กัน ประมาณ 7–10 เซนติเมตร (1 ฝ่ามือ)



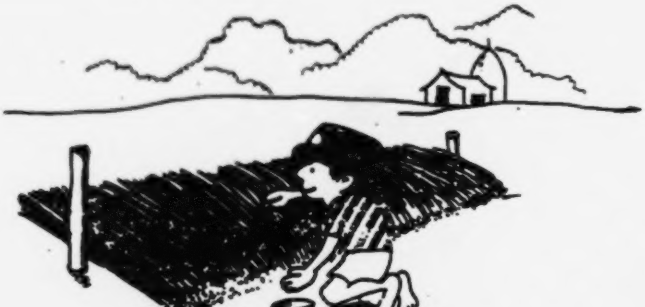
#4

ง. ขึ้นย่ำพร้อมกับรดน้ำไปด้วยให้ชุ่ม



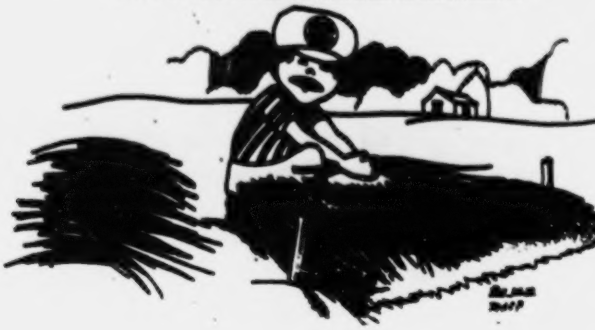
จ. โรยเชื้อเห็ดฟางให้เป็นแนว ทางด้านโคนของตอซัง จากขอบแปลง 7–10 เซนติเมตร (1 ฝ่ามือ) เป็นการทำเสร็จชั้นที่ 1

#5



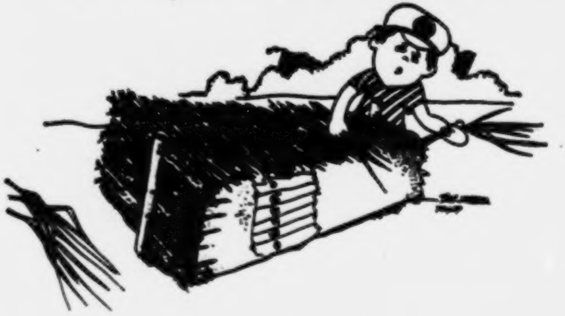
ฉ. ทำชั้นที่ 2 ต่อไป โดยนำตอซังมาวางเรียงทับชั้นที่ 1 แต่ต้องให้ด้านโคนอยู่คนละฝั่งกับชั้นแรก และขึ้นย่ำพร้อมกับรดน้ำแล้วโรยเชื้อเห็ดเช่นเดียวกับชั้นแรก

#6



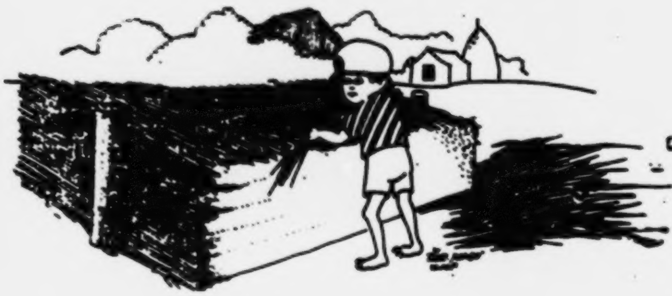
#7

ช. ทำชั้นที่ 3 4 5 6 และ 7 เช่นเดียวกับชั้นที่ 1 และ 2 สำหรับชั้นสุดท้ายให้โรยเชื้อเห็ดให้ทั่วหลังกองฟางเลย



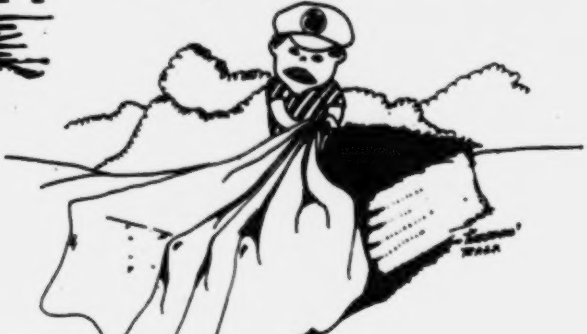
#8

ซ. แล้วใช้ฟางเปียกวางทับไปตามแนวยาวของกอง ให้หนาประมาณ 7–10 เซนติเมตร (1 ฝ่ามือ) เช่นกัน



ฌ. เสร็จแล้วคลุมกองฟางด้วยแผงจากหรือพลาสติก

#9



การเพาะเห็ดแบบกองสูง เมื่อเพาะไปแล้ว 12–15 วัน เห็ดจะออกดอกให้เก็บได้นาน 1–2 เดือน คิดเป็นผลผลิตทั้งสิ้นหนักประมาณ 10–20 กิโลกรัมต่อกอง

SESSION TITLE: Demonstration Preparation

SESSION #90 WEEK #7 DAY #39 (90-7-39)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 C

INTRODUCTION: SESSION PREPARATION

Each trainee will give a demonstration on Field Day. The trainees need time to prepare their demonstrations and clarify what is expected of them. The objectives of this session are:

- To have each trainee select his/her demonstration topic and the type of demo that s/he will do.
- To have each trainee complete a rough outline of his/her demonstration.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To choose
To prepare

Outline
Topics

SESSION TITLE: Swine Selection

SESSION #91 WEEK #7 DAY #39 (91-7-39)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-11:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Because of genetic variability, physical characteristics of swine have an effect not only on the reproductive performance, but also on the growth production of individual animals. At the end of this session trainees will:

- Be familiar with methods of selection based on conformation and production characteristics.
- Be able to identify characteristics of good feeders and breeding stock.
- Be able to identify the common breeds of swine used locally.

HAND-OUTS: #91-a Record Keeping and Field Notebook Guide for Swine.

#91-b Swine Anatomy.

READING ASSIGNMENT: Small-scale Pig Raising, Pgs 30-44.

HAND-OUT #91-a

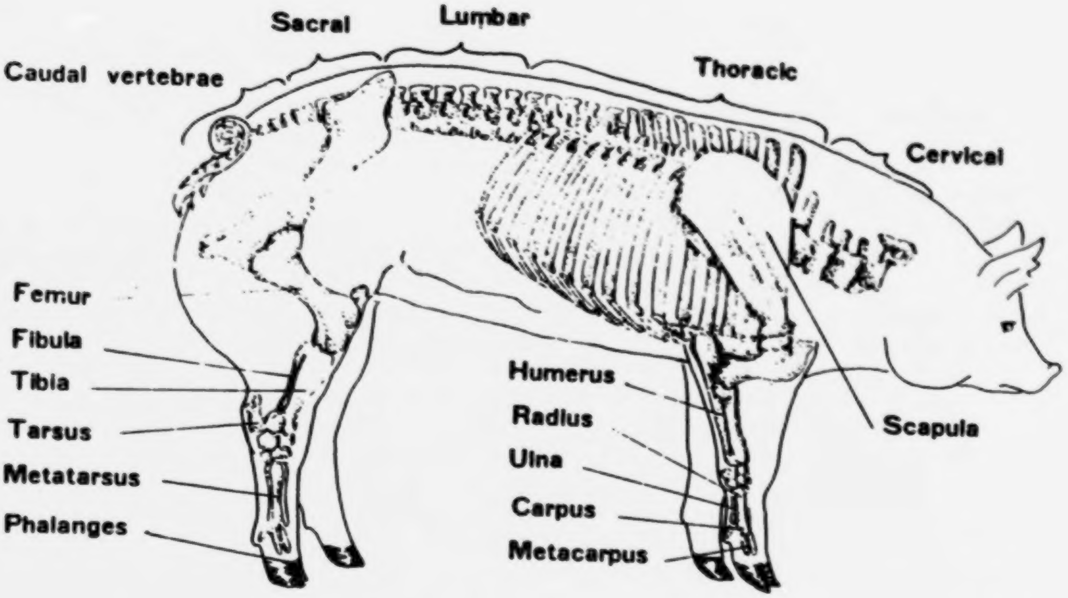
RECORD KEEPING AND FIELD NOTEBOOK GUIDE FOR SWINE

The sample records that have been included are designed to provide ideas about record keeping and important points and dates that you would want to keep track of. No matter how large or small your swine herd, record keeping is important as a management tool and can affect the profit of your operation. The design or format of these records is not important; you may find that given the size of your herd, you can keep detailed records that are adequate for you on a large calendar. Some of the points included on these sample records are obviously not needed in all cases (such as the sow's pedigree). They are intended to provide one sample of how a record keeping system can be organized and to provide ideas on important points. Listed below are some of the points I consider to be important and that should be included in your records and field notebooks Remember that these are not feed consumption records (which should be kept separately) but are breeding and production records.

1. Breeding date of sow
2. Breed of the sow and the mating boar
3. Identification of the breeding boar
4. Farrowing date of the sow
5. Number of piglets born (and how many of each sex)
6. Their birth weights
7. Number of piglets weaned and their weaning weights
8. Weaning date
9. Health and temperament observations of the sow
10. Number of piglets born dead
11. Number of functioning teats of the sow
12. Which of the litter were kept for future breeding stock and which were sold off or eaten
13. Assign a number to each individual litter
14. Is it the first, second, third, etc. litter of the sow?
15. Complete health records: Date and dosages of any vaccinations or medications
16. Date and cause of any death
17. Any findings from post-mortem examinations
18. Any notes or findings on individual or overall herd health
19. Castration, iron shots, and clipping of needle teeth dates
20. Who was the pig sold to and for how much?

HAND-OUT #91-b

FIGURE # 15 SWINE ANATOMY


Sacral
Lumbar
Caudal vertebrae
Thoracic
Cervical
Femur
Fibula
Tibia
Tarsus
Metatarsus
Phalanges
Humerus
Radius
Ulna
Carpus
Metacarpus
Scapula

Vocational Agriculture Service — College of Agriculture — University of Illinois at Urbana-Champaign (Swine 21)

SESSION TITLE: Co-workers and Helping

SESSION #92 WEEK #7 DAY #40 (92-7-40)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:30 C

INTRODUCTION: SESSION OBJECTIVES

Peace Corps puts a lot of emphasis on transferring skills and working with others, which is seldom as easy as it might appear to be. The work styles of different PCVs and those of host-country counterparts can differ greatly, as can concepts of what constitutes "helping." PCVs can save a lot of time by assessing how they and others stand on these two issues. A better understanding of these two concepts increases the likelihood of their happening.

NOTE: It is important to note that, although this session was developed for Crossover volunteers it can be used in a general sense. For that reason, words that are Program Specific are enclosed in parentheses.

The objectives of this session are:

- o To explore different styles of working with others and assess the consequences of those styles.
- o To consider how one's personal, preferred style of working with others may affect one's work and how to adapt that style when necessary.

HAND-OUTS: #92-a Working Style Inventory - Trainees should complete it prior to the session.

#92-b Your Co-worker---The (Agriculture Teacher)

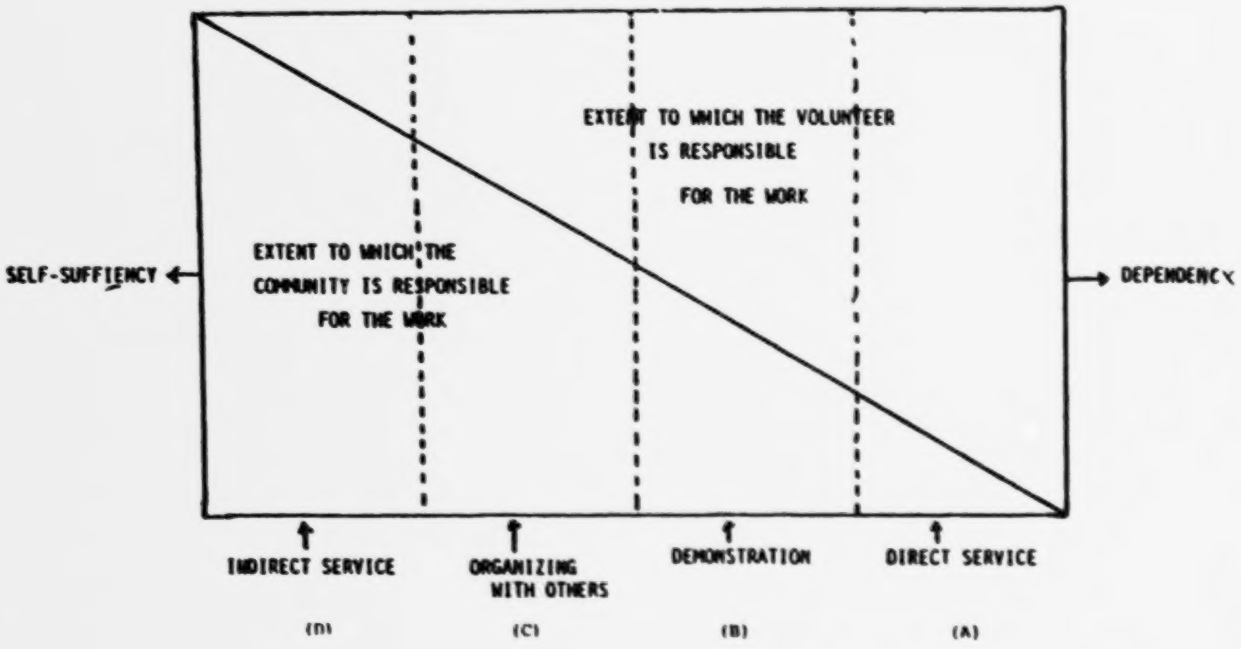
#92-c Transferring Responsibility

REDING ASSIGNMENT:

TECHNICAL VOCABULARY:

Co-worker To help

FIGURE # 16 CONTINUUM OF VOLUNTEER HELPING/WORK STYLES


EXTENT TO WHICH THE VOLUNTEER IS RESPONSIBLE FOR THE WORK
EXTENT TO WHICH THE COMMUNITY IS RESPONSIBLE FOR THE WORK
SELF-SUFFIENCY
DEPENDENCY
INDIRECT SERVICE
(D)
ORGANIZING WITH OTHERS
(C)
DEMONSTRATION
(B)
DIRECT SERVICE
(A)

HAND-OUT #92-a

WORKING STYLE INVENTORY

SELF-ASSESSEMENT

Sixteen situations typical of those faced by Peace Corps Volunteers in the past are described below. Four different ways of handling each situation are described next. Select the way of handling each situation which you prefer and assign the number "4" to that choice. Select your next preferred choice and assign a "3" to it. Assign a "2" to the next preferred choice and then a "1" for the least preferred choice. Assign your numerical choices directly on the scoring sheet attached to this self-assessment form.

This form is designed to help you assess your own personal preferred style of handling situations which you are likely to face during service as a volunteer. Later, you will analyze the results yourself and will be given opportunities to try out different ways to handle similar situations.

ASSIGN A "4", "3", "2", or a "1" IN THE ORDER OF YOUR PERSONAL PREFERENCE FOR HANDLING EACH SITUATION DESCRIBED. PLACE YOUR RESPONSES DIRECTLY ON THE SCORING SHEET ATTACHED TO THIS SELF-ASSESSMENT FORM.

SITUATION #1

You are entering your assigned village to take over an appropriate technology project. The volunteer you are replacing has already left. The project is three years old. You have had brief discussions with village leadership and get the sense that the project is being received with mixed results. You have been asked to address a meeting of village leaders to introduce yourself. How would you prefer to handle the situation? (Respond on Scoring Sheet!)

Choices:

1. Present your approach to the project and ask for questions and advice.
2. Seek the leadership's view of the project and identify problems.
3. Ask the leaders to describe their goals for the project, as well as other pressing needs the village is facing.

4. Ask the leadership if you can sit in on this meeting and become better acquainted with village needs before addressing a meeting.

SITUATION #2

You have been assigned to help the largest village cooperative keep their financial records straight and to provide general management assistance to coop leaders. The cooperative is operating at a deficit, and membership is declining. You need to decide how to prioritize your time from the following choices.

Choices

5. Develop a balance sheet and income statement to analyze causes of the deficit.

6. Work with coop manager and bookkeeper to identify causes of deficit and declining membership.

7. Encourage coop leadership to call a membership meeting to discuss the causes of deficit and declining membership.

8. Observe everyday functioning of the coop and informally talk with people who belong and do not belong to the enterprise.

SITUATION #3

You have been assigned as a teacher in the local trade school in manual arts. A disagreement has arisen among the faculty about whether to emphasize employable skills-training or preparation for advanced training. You are about to attend a faculty meeting to discuss these issues. You are the only expatriate member of the faculty. What is your strategy?

Choices

9. Publicy state your point of view indicating a willingness to listen.

10. Meet with influential faculty and seek to influence them to your point of view.

11. Seek the advice of fellow faculty and follow it.

12. Take a position in public and attend the meeting to listen and learn.

SITUATION #4

You are assigned to a small vegetable cooperative project which has been underway for several years. There is very high interest in the project among the village at large. However, the local leadership has just decided all coop labor must be assigned to re-building the bridge recently flooded out during the rainy season. This is planting time for the vegetable coop. What would you do?

Choices

13. Persuade the leaders to change their priorities, at least to enable the once-a-year planting in the vegetable fields.

14. Help the leadership identify some alternatives to choosing between the vegetable crop and the bridge.

15. Help the local vegetable coop manager develop strategies to try to get the local leaders to reconsider.

16. Join in and facilitate bridge repair in an effort to complete it in time to also plant vegetable plots.

SITUATION #5

You are in the last six months of your tour. It is unclear whether you will be replaced by another volunteer. The local project committee is urging you to be sure to finish a gravity irrigation project before you leave. You are not sure you can complete in is the time allotted. How will you handle this pressure?

Choices

17. Try as hard as you can to complete the project.

18. Lead a planning meeting with the local project committee and staff and try to develop alternative strategies.

19. Concentrate on developing skills in local project staff to enable them to complete the project after your departure.

20. Pass the dilemma on to the local project staff leaders and encourage them to solve the problem and tell you what to do.

SITUATION #6

A new counterpart has been assigned to your food production project. He/she does not have the connections with local district officials which the previous counterpart had and seems unable to use connections to get needed inputs. If you do not get the needed inputs soon, serious food shortages could result at harvest time. What will you do?

Choices

21. Use your previous associations through the past counterpart to ensure the required inputs are received in time.

22. Develop strategy with new counterpart to provide introductions and contacts to enable him/her to get inputs in time.

23. Ask new counterpart to develop plan to get inputs, and critique plan.

24. Encourage new counterpart to go out and try to figure out how to get needed inputs.

SITUATION #7

You have taken over an agricultural production project of the "green revolution" type with a "most promising farmer" orientation. There are two very progressive farmers using the new technologies and greatly increasing their cultivated land. Most farmers in the area have not adopted the new practices. The village leadership is predicting scarcity to starvation next year if food production is not greatly increased. Where will you focus your time?

Choices

25. On increasing food production by whatever means, including using the progressive farmers as "model" farmers for others.

26. Balancing between encouraging the progressive and working directly with more traditional farmers.

27. Organizing traditional farmers and training them in new agricultural practices.

28. Identifying why traditional farmers are not adopting new agricultural practices.

SITUATION #8

The village to which you have been assigned has a native bee-keeping project going and are highly motivated about it. Your assignment is a general agricultural assignment, but you happen to know quite a bit about bee-keeping and can see some ways to help improve their already successful project. They have shown no interest in using you in that way. How will you respond?

Choices

29. Speak to village and project leaders laying out some of your ideas for improving the project and suggesting change in your assignment.

30. Make a suggestion from time to time, informally, demonstrating your competence in this area.

31. Share your dilemma with your counterpart and seek his/her advice and follow it.

32. Move ahead with your assignment as planned, being alert to any future opportunities to be helpful in an informal way with the bee-keeping.

SITUATION #9

You are beginning the second year of your two-year teaching contract. You have been able to introduce some innovative methods, and students and fellow faculty have responded well and begun to adapt them. Some students in particular have "blossomed" under your direction. What are your priorities for the next eight months?

Choices

33. Focus on blossoming students and bring more into the fold.

34. Organize special teacher-training seminars to broaden and deepen innovations in curriculum and teacher practices.

35. Seek opportunities to co-teach with counterparts to solidify innovations already adopted.

36. Begin planned withdrawal to lessen dependency on you for sustaining innovations adopted.

SITUATION #10

You are a health and nutrition specialist assigned to a community clinic with a very vague and general assignment. The needs surrounding you are overwhelming, but you don't know where to begin. The clinic director seems glad to have you, but has provided no specific direction. How will you begin?

Choices

37. Assess your strongest field and make a concrete proposition to the director to clarify your role.

38. Ask for a meeting with the director to mutually explore his/her priorities and ascertain where you can be most helpful.

39. Ask your counterpart(s) if you can observe them for a month in hope of identifying areas where your skills can complement theirs.

40. Conduct a community needs assessment and develop your role in response to community needs.

SITUATION #11

You are a technician assigned to a well-drilling project in a community where potable water is in short supply. You know how to dig a well and have demonstrated how to do so. However, in this culture, manual labor by men is frowned upon. They are happy to have you dig wells while they watch. What will you do?

Choice

41. Continue digging to model that manual labor is o.k. and, by example, influence local men to join you.

42. Meet with influential leaders and point out the necessity for potable water and its relationship with health problems in the community.

43. Meet with counterpart(s) and try to get them to help you solve the problem.

44. Stop digging wells and focus your attention on overall community needs and how you might help meet some of those needs.

SITUATION #12

You have been working as an athletic coach in the community and, under your direction, the community has produced outstanding teams. It is a matter of considerable pride to community leaders, and they have asked you to continue to win. You have noticed little parental involvement, however, and in order to win you have focussed attention on a small number of talented youth. How will you change the situation?

Choices

45. Try to maintain your winning teams, while organizing new teams with more focus on parental involvement among new team members.

46. Call a meeting of existing and new parents and make a condition of your continued coaching, greater parental involvement all around.

47. Seek parental assistance in coaching, organize new teams, and focus your time on training new coaches.

48. Spread your "winners" among newly organized teams, minimize importance of "winning", and concentrate on parental involvement to identify new needs.

SITUATION #13

Your counterpart is becoming increasingly dominating during project committee meetings. As his/her confidence and skill has grown, you have gladly given more responsibility to the counterpart. But, it seems to you other committee members are becoming more withdrawn from the project. You want to build a strong project team, rather than just one strong counterpart. What should you do?

Choices

49. Raise the issue directly with the counterpart and offer to lead the next committee meeting to demonstrate participative leadership skills.

50. Provide help in planning the next meeting and make some specific suggestions to the counterpart about how to modify leadership behavior.

51. Watch for opportunities to provide feedback, ask the counterpart questions about how she/he thinks meetings are going, and reinforce participative behavior.

52. Leave the situation alone and count on the committee to call the counterpart on dominating behavior, then reinforce and offer to help.

SITUATION #14

You have just been assigned to a project which is a mess. Your counterpart appears to have opened a small shop for a second income and is not showing up for project work. Community leaders are unhappy because the project was begun with a lot of enthusiasm. They have asked you to take over and straighten it out. How will you proceed?

Choices

53. Take over and straighten out the project first, then deal with the counterpart problem later.

54. Confront the counterpart with his/her behavior and provide ongoing consultation until both problems are more manageable.

55. Present counterpart with pressing project problems and ask him/her to suggest solutions and plans to implement solutions.

56. Call meeting with leaders and counterpart and facilitate a problem-solving session as first step toward project reorganization.

SITUATION #15

You are working in a community with another volunteer. You have just become aware that the other volunteer has deeply offended the leaders because of dress code behavior. The level of distress in the community is rising and inhibiting the success of both of your assignments. How will you handle this?

Choices

57. Speak to the other volunteer immediately and strongly suggest she/he change inappropriate behavior.

58. Consult with the other volunteer and try to understand reasons for the behavior in a mutual problem-solving manner.

59. Bring influential community leader(s) and the other volunteer together to mutually explore problem and solutions.

60. Encourage local leaders to go to volunteer on their own and offer to be available if they need help.

SITUATION #16

Your counterpart is moderately skilled and experienced and moderately interested in your project. She/he does not see the project as advancing her/his own career. The village, however, is vitally interested in the project. How would you handle this situation?

Choices

61. Try to get counterpart reassigned, and temporarily take over direction of the project until a new person is assigned.

62. Spend time with counterpart trying to identify ways in which his/her role in the project can both meet project goals and career aspirations.

63. Work with counterpart on career goals and help her/him develop strategy for pursuing them, including leaving project if appropriate.

64. Facilitate a meeting between community leaders and counterpart to see if they can come up with a mutually satisfactory solution to the problem.

SCORING SHEET

INSTRUCTIONS:

Enter your responses for each of the sixteen situations above. Assign a "4" to your first choice, a "3" to your second choice, a "2" to your next choice, and a "1" to your last choice in each situation.

When you have responded fully to each set of choices, total the numbers vertically in each column.

(A)	(B)	(C)	(D)
1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.
13.	14.	15.	16.
17.	18.	19.	20.
21.	22.	23.	24.
25.	26.	27.	28.
29.	30.	31.	32.
33.	34.	35.	36.
37.	38.	39.	40.
41.	42.	43.	44.
45.	46.	47.	48.
49.	50.	51.	52.
53.	54.	55.	56.
57.	58.	59.	60.
61.	62.	63.	64.
Total.......	Total........	Total........	Total........

HAND-OUT #92-b

YOUR CO-WORKER --- THE AGRICULTURE TEACHER

This is primarily about the one, two or three agriculture teachers at your school. However it will also give you some ideas about English and other teachers at your school.

HIS (HER) JOB

His primary duty is to teach agriculture classes, which are of two sorts, the basic agriculture course which all students take one term/year, for two hours/week and the elective course which some students will take every term, for two hours/week in M.1 and M.2 and four hours/week in M.3.

He will have some duties at school, possibly looking after the school grounds or supervising the janitors. He may or may not be expected to set up and maintain agricultural demonstration projects. Some agriculture teachers do extension work, but not much, unless they are well known by the villagers and the villagers come to them. Many of them will raise chickens or pigs to make some money on the side.

He is also the advisor of F.F.T. and will have specific duties toward it. It is possible that he will be one of the Ajaan Yai's main men and that may give him numerous duties that will prevent him from carrying out his agriculture duties. Such things are relative--relative to the Ajaan Yai. Most people appreciate it when we make their job easier and few people like it when we think of extra work for them to do. If you come up with ideas that will make more work for him, you better have something in it for him.

HIS (HER) MOTIVATION

Like many people, he needs a job to support himself and his family. You may wonder why he chose this particular job; he may wonder also. Possibly, the agriculture college was the only thing he could get into after M.3 or maybe he really likes agriculture or maybe he heard the agriculture college was fun. It is unlikely that he is running on altruistic goals, though he will have a few ideals lurking around somewhere.

Now that he is a teacher, he has a job for life, independent of performance. Raises, however; called two-steps, are handed out by the Ajaan Yai every year and competition for them can be nasty. Depending on the Ajaan Yai's criteria, the agriculture teacher may be affected. If he got a two-step last year, this will not be a factor for a while, since few teachers get many of these raises.

This leaves intangibles as the motivators that you can affect. Pride in the work he does, social standing, fun, desire to help, the need to be respected, a chance to get out of the house, freedom, creativity, emulation of a good role model, friendship, money, and something to do, may be things that will motivate him (or her).

YOUR RELATIONSHIP

You may be older or younger than him, you may know more or less about agriculture than he does, you may be smarter, better organized, more highly motivated, or not, but these things won't make a big difference at first. You are new and he has probably been around for a year or more, and he's been in Thailand much longer than you. That means you've got a lot to learn from him--first--even if there are many things you can teach him. You can teach him once he accepts you as his teacher. Start with asking a lot of questions, particularly the kind that he can answer; some questions that neither of you can answer now, but can search for an answer together, and later, questions that you can answer, in order to establish yourself as someone who knows something.

Be friends. That may mean drinking together, though not getting sick together. It may mean admiring his children and having dinner with him. It definitely means not judging him quickly and trying to understand why he does some of the things he does (especially the things that you don't like). Work and play aren't separated by much, don't try too hard to separate them.

He may want you to teach him English, but you may want to practice your Thai. Maybe there's a way you can do both and learn about agriculture at the same time. He may be insecure about his agricultural knowledge, maybe you are, too. Learn together. Visit fish stations and farmers together. Have fun.

(CO-WORKER-2)

SOME THINGS I'VE DONE--GOOD AND BAD

--- I disagreed with him in front of students and other adults. That made him look bad, even though I thought he was dangerously misleading people. BAD. I should've found a way to change the subject to avoid the conflict.

--- I walked by him while he was drinking with some friends. I was tired and busy, which I told him when he pressed me to sit down. BAD. I could have sat down for 10-15 minutes, had a small drink, chewed some fat, then politely took my leave. Instead, I acted like he wasn't my friend.

--- He likes to grow ornamental plants. I know nothing about them and don't care if I do. Still, I ask a few polite questions, so that he can ask me questions about the things that I know about. GOOD.

--- At first, I was embarrassed by my lack of knowledge and plainly told many people so. Later, after I acquired some agricultural knowledge, it was difficult to convince people that I wasn't the same old dummy. BAD. I could've been less humble, without acting like I knew everything. Show what you know, not what you don't know.

--- I expected to be listened to from the start. DUMB. That doesn't happen anywhere; one must always establish one's credibility first. Being a foreigner from some big University is nice, but not everything.

--- I took pictures of his kids and gave him copies. GOOD.

--- I remembered to buy sweets or toys for his kids when I went to Bangkok. GOOD.

--- He doesn't have a good reputation at my school. I helped him raise chickens, but took none of the credit, though there were problems and I did a lot of the work. We both know I made him look good and that I'm valuable for him.

--- He said he was my friend. Then he did something that I didn't consider to be something a friend should do. I got mad. BAD. We aren't close friends, we're Thai friends. Still, we could've talked about it, if I'd given it a chance.

--- He hit his wife. I threatened to hit him. DANGEROUS. Not my business.

--- I lent him money. BAD. It took four months of hard work to get it back.

--- His parents came to visit. I "wai"ed them and was very nice to them, although they asked me all the usual questions and I was bored. They didn't need me around all night, so I left after a little while. GOOD.

--- You of course will be working with different people than I have. The behavior mentioned above is basically being friendly and sensitive, rather than rude and stupid. I'm amazed at the stupid things I've done, but I've been forgiven.

HAND-OUT #92-c

TRANSFERRING RESPONSIBILITY

When an extension agent sets out to improve agriculture in a community he/she is interested in ideas actively accepted and hence he/she accepts all the responsibility for their acceptance. Once the farmers or community recognize it as in their personal interest, then it is time to transfer the responsibility to the farmers themselves for introducing the new ideas and making them work.

MAKING A FARMER'S WORK HIS/HER OWN

Since the extension agent must teach each aspect of improved agricultural practices, he/she must demonstrate each activity or have someone do it with or for the farmer the first time. It is important to transfer the responsibility for accepting and using new practices by "handing over" a farmer's work to him as soon as possible and as many times as necessary. Adherence to the principle of self-help responsibility transferring goes far.

CREATING A LIMITED AND CLEAR ROLE

A terribly counter-productive fallacy under which farmers, villagers, and some development workers labor is that extension is the act of doing something for a client and not with him/her. From the very beginning the role must be reiterated many times. It is essential that in everything the extension agent does to "facilitate" work going on in a village, a native counterpart must participate and the how and why of what is done must be explained to the farmers. The extension agents' role should run a standard course: it should expand as farmers' interest in specific extension services grow initially, then it should slowly contract as farmers' responsibility and self-motivation grow, until the role virtually dries up as farmers approach self-sufficiency and self-reliance with regard to those specific services. Being an extension agent involves attaining complete empathy with farmers, but it does not include doing all of a farmer's work. The extension worker teaches and transfers responsibility to farmers who are initially and repeatedly made aware of what they must do and what responsibilities they have in the new work they espouse.

WHY DO IT?

One way of helping a community to solve its own problem is to create indigenous problem solvers. These people not only operate as a resource to be called upon by villagers, but also serve as role models. In addition they insure that organizations created to solve group problems are maintained.

IDENTIFYING AND TRAINING LEADERS

Part of the analysis which an extension organizer makes of the community involves the identification of local leaders. Leaders are of two types, formal and informal. Formal leaders like presidents, alphas, chiefs, generals are complemented by people like the wealthy, those who speak well, those who do something well (master farmers), who are informal leaders of people.

Obviously a technically skilled farmer who just wants to be left alone will not be a good leader, nor will a bright 13 year old, nor an important man who has no interest in the work.

Leaders are people who have followers. During contacts with the village people the extension organizer identifies the people who have followers. As part of the process of "testing" people, defining an issue, and determining who are interested in those issues, the extension agent "tests" leaders to ascertain their skills and their personal interests. In the case of leaders who express interest, the extension agent asks them to help as leaders of people working on pertinent issues. The organizer-agent can develop the skills of these leaders by giving them more and more responsibility for the work people have undertaken. It is advisable to maintain a group of leaders initially, loosely organized so the best and most interested leaders can eventually find their way to the top. By an increasingly demanding and insistent transfer of responsibility for the work from the organizer to these local leaders, the agent helps develop the local leadership and--coincidentally--the organization of the people who work. Training leaders is the key to the extension agent eventually "working him/herself out of a job". It is an on-going, very, very long process, however, that must begin immediately after the agent arrives in a village.

SESSION TITLE: Pig Diseases

SESSION: #93 WEEK #7 DAY #40 (93-7-40)

PRESENTER:

CO-FACILITATOR:

TIME: 10:30-11:30 F

INTRODUCTION: SESSION OBJECTIVES

Disease control is a major factor in swine management and it is important for the trainees to know the basics. With this session the trainees.

- Will learn and understand the methods of controlling and treating important swine diseases.
- Will treat pigs for internal parasites.

HAND-OUT:

READING ASSIGNMENTS: Small-scale Pig Raising. Pgs 169-193.

SESSION TITLE: Communication Skills

SESSION #94 WEEK #7 DAY #41 (94-7-41)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 C

INTRODUCTION: SESSION OBJECTIVES

People in different cultures use different methods to communicate. PCVs frequently find themselves in discussions about a multitude of topics, in which they and their host-country friends usually behave somewhat differently. It is very important for PCVs to recognize how they behave in discussions, in order to assess the effect they have on such discussions. This session prepares trainees for such self-assessment. The objectives of this session are:

- o To identify communication, group maintenance and task oriented skills exhibited and observed by trainees.
- o To reflect upon and generalize skills that will be useful at PC assignments.

HAND-OUTS:
#94-a--On U.S. Volunteers
#94-b--Group Maintenance Oriented Behavior Worksheet
#94-c--Task Oriented Behavior Worksheet
#94-d--Observer's Worksheet
#94-e--Task Oriented Behavior/Group Maintenance Oriented Behavior
#94-f--Communication Skills Self Rating Form

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To communicate
To discuss
To argue
To listen
To observe

HAND-OUT #94-a

ON U.S. VOLUNTEERS

For the past six years, I have become known for my increasing opposition to the presence of any and all North American "do gooders" in Latin America. I am sure you know of my present efforts to obtain the voluntary withdrawal of all North American volunteer armies from Latin America: missionaries, Peace Corps members and groups like yours, a "division" organized for the benevolent invasion (of Mexico).

I do not come here to argue. I am here to tell you, if possible to convince you, and, hopefully, to stop you, from pretentiously imposing yourselves on Mexicans.

I do have deep faith in the enormous good will of the U.S. Volunteer. However, his good faith can usually be explained only by an abysmal lack of intuitive delicacy. By definition, you cannot help being ultimately vacationing salesmen for the middle-class "American Way of Life", since that is really the only life you know.

A group like this could not have developed unless a mood in the United States has supported it--the belief that any true American must share God's blessings with his poorer fellow men. The idea that every American has something to give, and at all times may, can, and should give it, explains why it occurred to students that they could help Mexicans peasants "developing" by spending a few months in their villages.

Of course, this surprising conviction was supported by members of a missionary order, who would have no reason to exist unless they had the same conviction--except a much stronger one. It is now high time to cure yourselves of this. You, like the values you carry, are the products of an American society of achievers and consumers, with its two-party system, its universal schooling, and its Family-Car affluency. You are ultimately consciously or unconsciously "salesmen" for a delusive ballet in the ideals of democracy, equal opportunity, and free enterprise among people who haven't the possibility of profiting from these. Next to money and guns, the third largest North American export is the U.S. idealist, who turns up in every theater of the world as the teacher, the volunteer, the missionary, the community organizer, the economic developer, and the vacationing do-gooder. Ideally, these people define their roles as service. Actually, they frequently wind up alleviating the damage done by money and weapons, or "seducing" the under-developed to the benefits of the world of affluence and achievement. Perhaps this is the moment to instead bring home to the people of the U.S. the knowledge that the way of life they have chosen is not alive enough to be shared.

By now it should be evident to all America that the U.S. is engaged in a tremendous struggle to survive. The U.S. cannot survive if the rest of the world is not convinced that here we have Heaven-on-Earth. The survival of the U.S. depends on the acceptance by all so-called "free" men that the U.S. middle-class has "made it". The U.S. way of life has become a religion which must be accepted by all those who do not want to die by the sword--or napalm. All over the globe the U.S. is fighting to protect and develop at least a minority who consumes what the U.S. majority can afford. Such is the purpose of the Alliance for Progress of the middle-class which the U.S. signed with Latin America some years ago. But increasingly this commercial alliance must be protected by weapons which allow the minority who can "make it" to protect their acquisitions and achievements.

But weapons are not enough to permit minority rule. The marginal masses become rambunctious unless they are given a "Creed" or belief which explains the status quo. This task is given to the U.S. volunteer whether he be a member of the Peace Corps or in a so-called "Pacification Program". The U.S. is currently engaged in a three front struggle to affirm its ideals of acquisition and achievement oriented "Democracy". I say "three fronts", because three great areas of the world are challenging the validity of a political and social system which makes the rich richer, and the poor increasingly marginal to that system.

In Asia, the U.S. is threatened by an established power--China. The U.S. op poses China with three weapons: The tiny Asian elites who could not have it any better than in an alliance with the United States, a huge war machine to stop the Chinese from "taking over" as it is usually put in this country, and, forcible re-education of the so-called "pacified" peoples. Another front is in the U.S. itself: The efforts to check the unwillingness of the black community to wait for graceful integration into the system.

And finally, in Latin America the Alliance For Progress has been quite successful in increasing the number of people who could not be better off--meaning the tiny, middle-class elites--and has created ideal conditions for military dictatorships. The dictators were formerly at the service of the plantation owners, but now they protect the new industrial complexes. And you came to help the underdog accept his destiny within this process.

All you will do in a Mexican village is create disorder. At best, you can try to convince Mexican girls that they should marry a young man who is self-made, rich, a consumer, and as disrespectful of tradition as one of you. At worst, in your "community development" spirit you might create just enough problems to get someone shot after your vacation ends and you rush back to your middle-class neighborhoods where your friends make jokes about "spics" and "wetbacks".

Suppose you went to a U.S. ghetto this summer and tried to help the poor there "help themselves". Very soon you would be either spit upon or laughed at. People offended by your pretentiousness would hit or spit. People who understand that your own bad consciences push you to this gesture would laugh condescendingly. Soon you would be made aware of your irrelevance among the poor, of your status as middle-class college students on a summer assignment. You would be roundly rejected, no matter....

If you have any sense of responsibility at all, start with your riots here at home. Work for the coming elections. McCarthy might lose, but certainly by campaigning for him you will know what you are doing, why you are doing it, and how to communicate with those to whom you speak. And you will know when you fail. If you insist on working with the poor if this is your vocation, then at least work among the poor who can tell you to go to hell. It is incredibly unfair for you to impose yourselves on a village where you are so linguistically deaf and dumb that you don't even understand what you are doing, or what people think of you. And it is profoundly damaging to yourselves when you define something that you want to do as "good", a "sacrifice", and "help"

I am here to suggest that you voluntarily renounce exercising the power being an American gives you. I am here to entreat you to freely, consciously, and humbly give up the legal right you have to impose your benevolence on Mexico. I am here to challenge you to recognize your inability, your helplessness, and your incapacity to do the "good" which you intended to do.

I am here to entreat you to use your money, your status, and your education to travel in Latin America. Come to look, come to climb our mountains, to enjoy our flowers. Come to study. But do not come to help.

Speech given by Ivan Illich at Cuernavca, Mexico, April 20, 1968

HAND-OUT #94-b

GROUP MAINTENANCE ORIENTED BEHAVIOR WORKSHEET

FUNCTIONAL BEHAVIOR TO ASSIST GROUPS IN MAINTAINING GROUP COHESIVENESS:

DIRECTIONS: Observe members and record the number of times each behavior is used by each member.

	GROUPS MEMBERS							
	1	2	3	4	5	6	7	8
1. HARMONIZING - attempts to reconcile disagreements; reducing tensions.								
2. GATE KEEPING - helping to keep communication channels open.								
3. ENCOURAGING - being friendly, warm, and responsive to others; nonverbal or verbal approval or acceptance by expressions.								
4. COMPROMISING - admitting error; modifying in the interest of group cohesion or growth.								
5. STANDARD SETTING AND TESTING - testing whether group is satisfied with its procedures; pointing out explicit or implicit norms which have been set.								
6. SENSING AND EXPRESSING FEELINGS - sensing feelings, mood, relationships within the group; sharing own feelings with other members; soliciting feelings of others.								
7. PERCEPTION CHECK								

From A Trainer's Guide to Andragogy; p. 137, by John Ingall

HAND-OUT #94-c

TASK ORIENTED BEHAVIOR WORKSHEET

FUNCTIONAL BEHAVIOR TO ASSIST GROUPS IN TASK PERFORMANCE:

DIRECTIONS: Observe and record the number of times each behavior is used by each member.

	GROUPS MEMBERS							
	1	2	3	4	5	6	7	8
1. INITIATING - proposing tasks or goals; defining a group problem, suggesting ideas.								
2. SEEKING INFORMATION - requesting facts, asking for expressions of opinion; seeking suggestions and ideas.								
3. GIVING INFORMATION - offering facts, information, opinions, and ideas.								
4. CLARIFYING AND ELABORATING - interpreting ideas or suggestions, defining terms indicating alternatives.								
5. SUMMARIZING - pulling together related ideas; offering a decision or conclusion for a group to accept or reject.								
6. CONSENSUS TESTING - sending up a trial balloon to test for a possible decision or conclusion.								

From J.D. Ingall's A Trainer' Guide to Andragogy, p. 138

HAND-OUT #94-d

OBSERVER'S WORKSHEET

1. Be sure you are able to see all participants' gestures, expressions, etc.
2. What roles are people performing--clarifying, initiating, supporting, harmonizing, or conflicting?
3. How are styles of communication--tone, phrasing, gestures, etc., contributing to or hindering clarity and effectiveness?
4. How are participants in the group reacting to each other?
5. Do participants' non-verbal gestures conform to their verbal statements?
6. To whom are people talking? To one other person? To persons who just previously talked? To the whole group? To no one?
7. What attitudes and emotions do you feel are being transmitted to the group? (Check out your own personal reactions to comments made by others).

From: _Ingall's A Trainers Guide to Anadragogy_, p. 175

HAND-OUT #94-e

TASK ORIENTED BEHAVIOR

1. INITIATING--proposing tasks or goals defining a group problem, suggesting ideas.
2. SEEKING INFORMATION--requesting facts, asking for expressions of opinion; seeking suggestions and ideas.
3. GIVING INFORMATION--offering facts, information, opinions, and ideas.
4. CLARIFYING AND ELABORATING--interpreting ideas or suggestions, defining terms, indicating alternatives.
5. SUMMARIZING--pulling together related ideas; offering a decision or conclusion for the group to accept or reject.
6. CONSENSUS TESTING--sending up a trial balloon to test for a possible decision or conclusion.

GROUP MAINTENANCE ORIENTED BEHAVIOR

1. HARMONIZING--attempts to reconcile disagreements; reducing tensions.
2. GATE KEEPING--helping to keep communication channels open; facilitating the participation of others.
3. ENCOURAGING--being friendly, warm and responsive to others; non-verbal or verbal approval or acceptance by expressions.
4. COMPROMISING--admitting error; modifying in the interest of group cohesion and growth.
5. STANDARD SETTING AND TEST testing whether group is satisfied with its procedures; pointing out explicit or implicit norms which have been set.
6. SENSING AND EXPRESSING FEELINGS--sensing feeling, mood, relationships within the group; sharing own feeling with other members soliciting feelings of others.
7. PERCEPTION CHECK--Describing what you perceive the other is feeling in order to check whether you do understand what s/he feels.

HAND-OUT #94-f

COMMUNICATION SKILLS: SELF RATING FORM

Please indicate where you rate your own abilities as of now by circling one of the numbers on the rating scales below. (Note: See #1 for rating scale identification.)

1. Ability to listen.

1	2	3	4	5	6	7	8	9
weak		fair		moderately strong		quite strong		very strong

2. Ability to paraphrase accurately.

1 2 3 4 5 6 7 8 9

3. Ability to express feelings.

1 2 3 4 5 6 7 8 9

4. Ability to give non-judgmental feedback.

1 2 3 4 5 6 7 8 9

5. Ability to identify and relate to other's feelings.

1 2 3 4 5 6 7 8 9

6. Ability to give specific rather than general feedback.

1 2 3 4 5 6 7 8 9

7. Ability to communicate non-verbally.

1 2 3 4 5 6 7 8 9

8. Ability to communicate trust.

1 2 3 4 5 6 7 8 9

9. Ability to clarify.

1 2 3 4 5 6 7 8 9

SESSION TITLE: Ajaan Yais I

SESSION #95 WEEK #7 DAY #41 (95-7-41)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 C

The Session Design for this Program Specific Session is in Appendix A.

SESSION TITLE: Demonstration Presentation (English)

SESSION #96 WEEK #7 DAY #42 (96-7-42)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 C

INTRODUCTION: SESSION OBJECTIVES

The fact that demonstrations will be presented in Thai on Field Day may intimidate some trainees. This session gives trainees a chance to practice their demonstrations in English in front of other trainees and receive suggestions. The objectives of this session are:

- To practice trainee demonstrations in English.
- To give and get feedback on demonstrations.

HAND-OUTS: #96-a Trainee Demonstration Evaluation Form

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To practice	Evaluation form
To give feedback	
To suggest	

HAND-OUT #96-a

TRAINEE DEMONSTRATION EVALUATION FORM

NAME OF PRESENTER____

NAME OF EVALUATOR ____

DEMONSTRATION NAME____________________________________TYPE______

Please indicate where you rate the presenter's demonstration by circling one of the numbers on the rating scales below. (Note #1 has rating scale identification.)

I. TOPIC RELEVANCE:

1. "Topic" made Thailand-specific.

1	2	3	4	5	6	7	8	9
weak		fair		moderately good		quite good		excellent

2. "Topic" needed by audience.

1 2 3 4 5 6 7 8 9

3. "Topic" affordable by audience.

1 2 3 4 5 6 7 8 9

4. "Topic" readily adaptable by audience.

1 2 3 4 5 6 7 8 9

5. "Topic" able to be learned by audience.

1 2 3 4 5 6 7 8 9

II. SET-UP, POSTERS AND MATERIALS:

6. Set-up visually appealing.

1 2 3 4 5 6 7 8 9

7. Posters visually appealing.

1 2 3 4 5 6 7 8 9

8. Materials informative, communicative.

1 2 3 4 5 6 7 8 9

9. Written instructions understandable, step-by-step.

1 2 3 4 5 6 7 8 9

III. PRESENTATION:

10. Clarity of presentation: communicative, understandable, vocabulary level appropriate.

1 2 3 4 5 6 7 8 9

11. Organization of presentation.

1 2 3 4 5 6 7 8 9

12. Level of enthusiasm of presenter.

1 2 3 4 5 6 7 8 9

13. Audience involvement in presentation: Participation, time for questions.

1 2 3 4 5 6 7 8 9

IV. ADDITIONAL ITEMS:

14. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

15. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

16. OVERALL RATING

1 2 3 4 5 6 7 8 9

HAND-OUT #96-a (copy 2)

TRAINEE DEMONSTRATION EVALUATION FORM

NAME OF PRESENTER____

NAME OF EVALUATOR ____

DEMONSTRATION NAME_____________________________________TYPE______

Please indicate where you rate the presenter's demonstration by circling one of the numbers on the rating scales below. (Note #1 has rating scale identification.)

I. TOPIC RELEVANCE:

1. "Topic" made Thailand-specific.

1	2	3	4	5	6	7	8	9
weak		fair		moderately good		quite good		excellent

2. "Topic" needed by audience.

1 2 3 4 5 6 7 8 9

3. "Topic" affordable by audience.

1 2 3 4 5 6 7 8 9

4. "Topic" readily adaptable by audience.

1 2 3 4 5 6 7 8 9

5. "Topic" able to be learned by audience.

1 2 3 4 5 6 7 8 9

II. SET-UP, POSTERS AND MATERIALS:

6. Set-up visually appealing.

1 2 3 4 5 6 7 8 9

7. Posters visually appealing.

1 2 3 4 5 6 7 8 9

8. Materials informative, communicative.

1 2 3 4 5 6 7 8 9

----

9. Written instructions understandable, step-by-step.

1 2 3 4 5 6 7 8 9

III. PRESENTATION:

10. Clarity of presentation: communicative, understandable, vocabulary level appropriate.

1 2 3 4 5 6 7 8 9

----

11. Organization of presentation.

1 2 3 4 5 6 7 8 9

----

12. Level of enthusiasm of presenter.

1 2 3 4 5 6 7 8 9

----

13. Audience involvement in presentation: Participation, time for questions.

1 2 3 4 5 6 7 8 9

IV. ADDITIONAL ITEMS:

14. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

----

15. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

```
*************************************************************
* 16. OVERALL RATING                                        *
*                                                           *
*  1      2      3      4      5      6      7      8     9 *
*  -------------------------------------------------------- *
*                                                           *
*************************************************************
```

HAND-OUT #96-a (copy 3)

TRAINEE DEMONSTRATION EVALUATION FORM

NAME OF PRESENTER____

NAME OF EVALUATOR ____

DEMONSTRATION NAME____________________________________TYPE______

Please indicate where you rate the presenter's demonstration by circling one of the numbers on the rating scales below. (Note #1 has rating scale identification.)

I. TOPIC RELEVANCE:

1. "Topic" made Thailand-specific.

1	2	3	4	5	6	7	8	9
weak		fair		moderately good		quite good		excellent

2. "Topic" needed by audience.

1 2 3 4 5 6 7 8 9

3. "Topic" affordable by audience.

1 2 3 4 5 6 7 8 9

4. "Topic" readily adaptable by audience.

1 2 3 4 5 6 7 8 9

5. "Topic" able to be learned by audience.

1 2 3 4 5 6 7 8 9

II. SET-UP, POSTERS AND MATERIALS:

6. Set-up visually appealing.

1 2 3 4 5 6 7 8 9

7. Posters visually appealing.

1 2 3 4 5 6 7 8 9

8. Materials informative, communicative.

1 2 3 4 5 6 7 8 9

----

9. Written instructions understandable, step-by-step.

1 2 3 4 5 6 7 8 9

III. PRESENTATION:

10. Clarity of presentation: communicative, understandable, vocabulary level appropriate.

1 2 3 4 5 6 7 8 9

----

11. Organization of presentation.

1 2 3 4 5 6 7 8 9

----

12. Level of enthusiasm of presenter.

1 2 3 4 5 6 7 8 9

----

13. Audience involvement in presentation: Participation, time for questions.

1 2 3 4 5 6 7 8 9

IV. ADDITIONAL ITEMS:

14. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

----

15. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

```
*****************************************************************
* 16. OVERALL RATING                                            *
*                                                               *
*  1      2      3      4      5      6      7      8      9    *
*  ----------------------------------------------------------   *
*                                                               *
*****************************************************************
```

HAND-OUT #96-a (copy 4)

TRAINEE DEMONSTRATION EVALUATION FORM

NAME OF PRESENTER____

NAME OF EVALUATOR ____

DEMONSTRATION NAME_________________________________TYPE_____

Please indicate where you rate the presenter's demonstration by circling one of the numbers on the rating scales below. (Note #1 has rating scale identification.)

I. TOPIC RELEVANCE:

1. "Topic" made Thailand-specific.

1	2	3	4	5	6	7	8	9
weak		fair		moderately good		quite good		excellent

2. "Topic" needed by audience.

1 2 3 4 5 6 7 8 9

3. "Topic" affordable by audience.

1 2 3 4 5 6 7 8 9

4. "Topic" readily adaptable by audience.

1 2 3 4 5 6 7 8 9

5. "Topic" able to be learned by audience.

1 2 3 4 5 6 7 8 9

II. SET-UP, POSTERS AND MATERIALS:

6. Set-up visually appealing.

1 2 3 4 5 6 7 8 9

7. Posters visually appealing.

1 2 3 4 5 6 7 8 9

8. Materials informative, communicative.

1 2 3 4 5 6 7 8 9

9. Written instructions understandable, step-by-step.

1 2 3 4 5 6 7 8 9

III. PRESENTATION:

10. Clarity of presentation: communicative, understandable, vocabulary level appropriate.

1 2 3 4 5 6 7 8 9

11. Organization of presentation.

1 2 3 4 5 6 7 8 9

12. Level of enthusiasm of presenter.

1 2 3 4 5 6 7 8 9

13. Audience involvement in presentation: Participation, time for questions.

1 2 3 4 5 6 7 8 9

IV. ADDITIONAL ITEMS:

14. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

15. Other (specify) ______________________________

1 2 3 4 5 6 7 8 9

16. OVERALL RATING

1 2 3 4 5 6 7 8 9

SESSION TITLE: Swine Reproduction

SESSION #97 WEEK #7 DAY #42 (97-7-42)

PRESENTER:

TIME: 10:00-12:00 F/C

INTRODUCTION: SESSION OBJECTIVES

Whether they will be directly involved in a swine breeding project or not, trainees who will be working with swine need to be familiar with the main stages of reproduction--both because of the effect of reproduction on the production and marketing of pigs and for their own credibility as agriculture teachers. This session is intended as an introduction to and overview of all stages in the reproduction of swine and the equipment and management practices associated with swine reproduction.

HAND-OUTS: #97-a Swine Production Record Forms
#97-b Swine Pork Cuts

READING ASSIGNMENT: Small-scale Pig Raising, Pgs 131-149

HAND-OUT #97-a1

PRODUCTION RECORD OF SOW

	1	2	3	4	5	6	7	8
Litter No.								
Sire								
No. services								
Farrowing data: Date								
Temperament of sow: (Gentle; nervous; cross)								
No. of pigs born: Alive								
Dead								
Mummies								
Total								
Av. birth weight								
No. functioning teats								
Weaning data: Age of piglets								
No. weaned								
Av. weaning wt								
Offspring saved for breeding No. gilts								
No. boars								

* * *

DISPOSAL OF SOW

Date____________Reasons____

Sold to ____

Price____

HAND-OUT 97-a2

INDIVIDUAL SOW RECORD

Breed____

Name and Registration No. __________________________________

Date Farrowed____

Identification____
(ear notch tattoo)

Bred by____
(Name and Address)

Sow's pedigree: ______________________ ______________________
(Sire) ______________________

____
______________________ (Dam) ______________________

Record of litter of which sow was a member:

No in litter _______________No. of pigs weaned ____________

Weaning weight at ______________________________days of age.

Her own weight_________. Average weight of litter____________.

Litter mate carcass record, if any:

No. carcasses______________: Av back fat___________ (in)

loin eye__________________ (sq in) length ________________ (in)

Number of teats _____________________

HAND-OUT 97-a3

INDIVIDUAL PIG RECORD

Pig No	Sex	No Teats	Birth Wt.	Off Color Mark-ings	Defects & Abnor-malities	Weaning Wt. ___days	Date Cast-rated	Date and Cause of Death

HAND-OUT #97-a4

LITTER RECORD

Breed____

Litter No. ______________________________________
(notch tatoo)

DATA ON DAM:

Pedigree: ______________________________________ ________________ (Sire)
(Name, reg. no. and ear notch)
________________ (Dam)

Birth date: ______________________________________

Litter mate carcass data, if any:
No. carcasses___;Av back fat_____(in);Loin eye;______(sq. in);length____(in)

Sow's ____________________________litter.
(first, second, etc.)

DATA ON SIRE:

Pedigree: ______________________________________ ____________ (Sire)
(Name, reg no. and ear notch)
____________ (Dam)

Birth date: ______________________________________

Litter mate carcass data, if any:
No. carcasses____;Av back fat______(in);Loin eye;_____(sq. in);length_____(in)

Date of Birth of litter ____________ Health Services:

No. of pigs born:
Alive __________
Dead __________
Mummies __________
Total __________

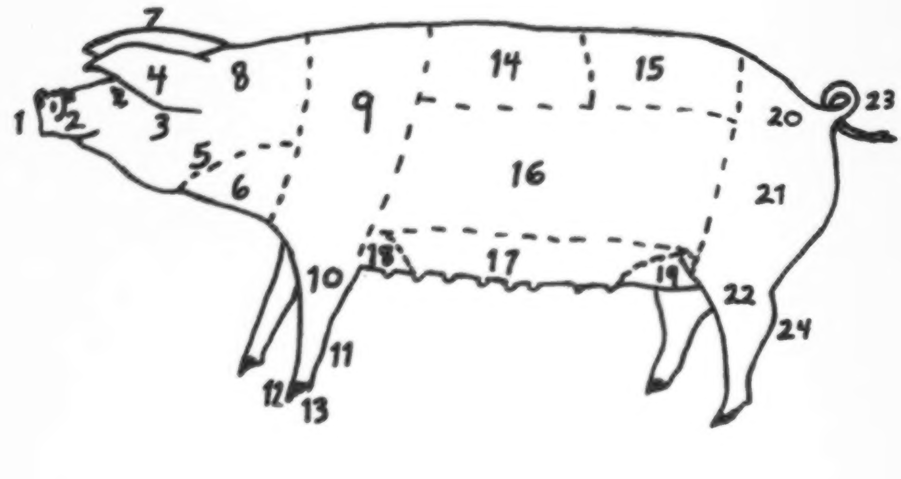
Date cholera vaccinated _________
Date crysipelus vaccinated ______
Date wormed ____________________
Other, including iron pills or shots
____

No. of pigs weaned ____

HAND-OUT #97-b

SWINE PORK CUTS

ENGLISH	THAI	ENGLISH	THAI
1. snout	จมูก	13. toes	กีบ
2. face	หน้า	14. back	หลัง
3. eye	ตา	15. loin	สะเอว
4. ear	หู	16. side	ด้านข้าง
5. cheek	แก้ม	17. belly	ท้อง
6. jowl	คาง	18. fore flank	ขาพับหน้า
7. poll	หน้าผาก	19. rear flank	ขาพับหลัง
8. neck	คอ	20. rump	บั้นท้าย
9. shoulder	ไหล่	21. ham	สะโพก
10. foreleg	ขาหน้า	22. hind leg	ขาหลัง
11. dew claw	นิ้วก้อย	23. tail	หาง
12. pastern	ข้อเท้า	24. hock	ข้อศอกขาหลัง


7
1
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12
13

Week #8

98	8	43	Maintenance	08:00-10:00	F
99	8	43	Field Day Preparation I	10:00-12:00	F/C
-	-	-	L/CC	13:30-16:30	-
100	8	44	Projects	08:00-09:30	C
101	8	44	Field Day Preparation II	09:30-10:30	F/C
102	8	44	Program Manager III	10:30-12:00	C
-	-	-	L/CC	13:30-16:30	-
103	8	45	Ajaan Yais II	08:00-09:30	C
-	-	-	L/CC	09:30-12:00	-
104	8	45	Field Day Preparation III	13:30-16:30	F/C
-	-	-	L/CC	08:00-12:00	-
105	8	46	Field Day Preparation IV	13:30-16:30	F/C
-	-	-	L/CC	08:00-12:00	-
106	8	47	Broiler Chicken Processing and Post-Mortem	13:30-16:30	F
107	8	48	Field Day	08:00-17:00	F
108	8	48	Field Day Evaluation	19:00-21:00	C

END OF AGRICULTURE TRAINING

109	9	50	Thai Student's Needs and Motivations
110	12	67	Garden Planning
111	12	71	Getting Feet in Doors

END OF TRAINING PROGRAM

SESSION TITLE: Maintenance

SESSION #98 WEEK #8 DAY #43 (98-8-43)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-10:00 F

INTRODUCTION: SESSION OBJECTIVES

This should be the last opportunity for trainees to work in the plots; therefore harvesting and final weeding should be completed. This will leave the plots in good condition as the trainees should have the option of returning to their plots during their free time.

SESSION TITLE: Field Day Preparation I

SESSION #99 WEEK #8 DAY #43 (99-8-43)

PRESENTER: Field Day Coordinator

CO-FACILITATOR: Trainees

TIME: 10:00-12:00 C/F

*** NOTE: There are five Field Day Preparation Sessions included in the schedule. The number of sessions is variable, but a total of 7-8 hours should be provided. All of the Field Day Preparation Sessions follow this design.

INTRODUCTION: SESSION OBJECTIVES

Time is made available, in different locations as needed, for the trainees to plan, organize and prepare for Field Day. This time is at their discretion, with staff available for support.

The objective of this session is:

- o To carry out and complete necessary preparations for Field Day.

HAND-OUTS: up to trainees

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Projects

SESSION #100 WEEK 8 DAY 44 (100-8-44)

PRESENTER: Trainer who is/was a PCV

CO-FACILITATOR:

TIME: 8:00-9:30 C

INTRODUCTION: SESSION OBJECTIVES

The Thai bureaucracy views "projects" very favorably and applies this label to many tasks. This can mean that the work a PCV does can be judged by the number and size of his/her projects and PCVs often feel the pressure to complete projects. However, it is important to apply the lessons of the session "Co-workers and Helping" to the way projects are to be done. It is also important to stress that there is support available from the Peace Corps Office and Peace Corps staff. The availability of this support needs to be emphasized to trainees before trainees arrive at their sites. The objectives of this session are:

- o To identify what "project" means in the context of the Thai bureaucracy and at the sites where trainees will be assigned.
- o To consider how to work with the Thai conceptions of projects in ways that take into account ideas developed in "Introduction to Development" and "Co-workers and Helping".
- o To learn what resources Peace Corps has to support projects and other PCV undertakings.

HAND-OUTS: #100-a What Funding Sources are Looking For
#100-b Project Proposal Form
and Nutrition

READING ASSIGNMENT: *Fear and Loathing on the Agricultural Guide*; Peace Corps Thailand Guide to Agricultural and Nutrition Resources in Thailand, pgs.51-5[illegible]; Small Project Proposals and Funding Sources.

TECHNICAL VOCABULARY

HAND-OUT #100-a

WHAT FUNDING SOURCES ARE LOOKING FOR

There is a range of priorities among the various funding sources known to Volunteers. For more specific information than is provided here, read Fear and Loathing on the Agricultural Trail, pgs. 51-55 and the relevant sections of the 1982 Agricultural Conference Handbook. The following are generalities, which you should check into more closely by visiting the agency, consulting with other volunteers or checking with the Office.

"Basic human needs" is a fairly strong requirement for most agencies. In general, a project satisfies "Basic Human Needs," when you are making an attempt to improve one or more of the following problems:

- Poor nutrition;
- Lack of clean drinking water;
- Poor sanitation;
- Lack of fuel;
- Inability to make a decent living;
- Inadequate housing;
- Poor health.

When you write a project proposal, you must convince the funding source that your project will improve a situation that it wants improved. Often, further requirements, such as self-help or matching funds, will be attached. A good proposal does not necessarily reflect a good project.

WHAT OTHER CROSSOVERS HAVE DONE

Nursery project: When connected with a Fruit Orchard intended to produce fruit or seedlings, this answers "basic human needs" because it is food related. When accompanied and intended for only flowers it ignores "basic human needs" unless there is a market for the flowers.

Broiler Chicken Project: Broilers are food, though not easily marketable. However, this is a good, acceptable project that can help you get into other things.

Biogas. Provides a good fuel and saves the forests--sometimes.

Fishpond. Lots of protein.

Water Tanks: Store rain water for the hot season, so there is something safe to drink.

Irrigation Improvement: To get water to the vegetables you are growing at school.

Pig Raising. Food. Educational and hopefully an example for villagers, though they might not come to check it out.

Mushrooms: Food and profits.

Home Projects: Any of the above scaled-down so a student can do it at home. Help students out, but don't do it yourself.

Ducks: Eggs and/or meat. Fertilizer in your fish pond.

SOME QUESTIONS TO ASK YOURSELF

1. Who will this project help. Students? Teachers? Farmers? Police?

2. Who wants this project? Just me? My Ajaan Yai? Ag teachers? Parents?

3. Why should I be involved?

4. Is this educational? Who gets educated besides me?

5. How will this help people?

6. Isn't it better to wait?

7. Shouldn't they do it themselves?

8. Will this project be any fun?

HAND-OUT #100-b

PROJECT PROPOSAL FORM

PC OFFICE USE ONLY
Funding Sources
____ HCC
____ SPA * IAA NO. ___/493/_____
____ Other * Specify___________
Project Deadline Date:__________

PEACE CORPS THAILAND

Project Proposal Request

1. Name of Volunteer;______________________ COS Date: __________

2. Volunteer Site of Assignment: ______________________________

a) Government Unit Name: _______________________________

b) Department: ______________________________________

c) Ministry: ____

3. Name of Project: ___________________________________

4. Project Location: __________________________________

5. Date of Request: ___________________________________

P. C. USE ONLY

6. Total Project Funds Required: Baht___________ U.S. $______

7. Total Funds Requested for this project: Baht___________ U.S. $______

8. General Background Information (community, population, economic state, agency involvement, etc.):

10. Project Description :

11. Community Impact and Justification (Number of Individuals Served, Directly and Indirectly):

12. Description of Local Contributions and how they will be used (type: i.e. cash, in kind, materials, etc.):

13. Involvement and Role, in the Project, of the recipient Group and the Agency to which the Volunteer is Assigned:

14. Budget Breakdown/Details:

1) Requested Budget ______________________________

Item	Amount Required	Unit Price	Total Baht

P.C. USE ONLY

	Baht	US$
* Total Budget Request:	_______	________
2) Other Funding Sources, and/or Contributions		
* Name of Individual/s and/or Agency:		
A. _________________________	_______	________
B. _________________________	_______	________
C. _________________________	_______	________
D. _________________________	_______	________
* Total Project Budget:	_______	_________

15. Proposal submitted on: (Date) ______________________________

16. Proposal submitted by:

    1. PCV Name: ______________________________

       Signature ______________________________

    2. Co-worker or group leader (Name): ______________________

       Signature: ______________________________

17. Proposal Approved by ______________________________

    Signature ______________________________

ote: Official cover letter of approval from Head of local government agency must be attached to each project proposal.

SESSION TITLE: Field Day Preparation II

SESSION #101 WEEK #8 DAY #44 (101-8-44)

PRESENTER:

CO-FACILITATOR:

TIME: 9:30-10:30 F/C

See Session 99-8-43.

SESSION TITLE: Program Manager III

SESSION #102 WEEK #8 DAY #44 (102-8-44)

PRESENTER:

CO-FACILITATOR:

TIME: 10:30-12:00 C

INTRODUCTION: SESSION OBJECTIVES

(Education) Program Manager talks with trainees about the (Crossover) program.

Objectives are:

- To inform trainees about the (Crossover) program.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Ajaan Yais II

SESSION #103 WEEK #8 DAY #45 (103-8-45)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:30 C

The Session Design for this Program Specific Session is in Appendix A.

SESSION TITLE: Field Day Preparation III

SESSION #104 WEEK #8 DAY # 45 (104-8-45)

PRESENTER:

CO-FACILITATOR:

TIME: 13:30-16:30 F/C

See Session 99-8-43.

SESSION TITLE: Field Day Preparation IV

SESSION #105 WEEK #8 DAY #46 (105-8-46)

PRESENTER:

CO-FACILITATOR:

TIME: 13:30-16:30 F/C

See Session 99-8-43.

SESSSION TITLE: Broiler Chicken Processing and Post-Mortem

SESSION #106 WEEK #8 DAY #47 (106-8-47)

PRESENTER:

CO-FACILITATOR:

TIME: 13:30-16:30 F

INTRODUCTION: SESSION OBJECTIVES

It is important that the trainees know how chickens are killed and processed for market as well as the post-mortem aspect of growing poultry. This session will give the trainees experience:

- In the proper methods of killing chickens for market.
- In how to clean and prepare after killing.
- In examining the internal organs for parasites or disease.

HAND-OUT:

READING ASSIGNMENT: _Salsbury Manual of Poultry Diseases_, Pgs 28-29.

SESSION TITLE: Field Day

SESSION #107 WEEK #8 DAY #48 (107-8-48)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-17:00 F

INTRODUCTION: SESSION OBJECTIVES

Field Day, as described and planned in previous sessions, happens.

The objectives of this session are:

- To learn.
- To have fun.
- To eat our chickens.
- To sell our pigs.
- To give demonstrations.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

FIELD DAY NOTES

FIELD DAY NOTES

SESSION TITLE: Field Day Evaluation

SESSION #108 WEEK #8 DAY #48 (108-8-48)

PRESENTER:

CO-FACILITATOR:

TIME: 19:00-21:00 C

INTRODUCTION: SESSION OBJECTIVES

Evaluation is a critical part of any training activity (most Peace Corps activities and projects include an evaluation aspect). Evaluation helps participants make the most of their experience and produces advice for others. Evaluation also provides an opportunity for participants to compare their assessments of events with others and learn from the experience in order to do it better next time. (It is hoped that many of the trainees will have events like Field Day at their sites.)

The objectives of this session are:

- To judge which aspects of Field Day went well, which didn't, and why.
- To consider how trainees might do something like Field Day at their sites.
- To make suggestions for future Field Days for Agricultural Training.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

WEEKS #9-#12 SCHEDULE

(These sessions occur during the TEFL and
Final Wrap-up Phases of Training)

SESSION TITLE: Thai Students Needs and Motivations

SESSION #109 WEEK #9 DAY #50 (109-9-50)

PRESENTER:

CO-FACILITATOR:

TIME: 10:30-12:00 C

The Session Design for this PS Session is in Appendix A.

SESSION TITLE: Garden Planning

SESSION #110 WEEK #12 DAY #67 (110-12-67)

PRESENTER:

CO-FACILITATOR:

TIME: 13:30-16:30 C

INTRODUCTION: SESSION OBJECTIVES

It is the end of training and this session is intended to wrap-up the agricultural component. Many sessions, particularly "Planting Situations," lead up to this exercise. This is a chance for trainees to work with each other (as they would with co-workers) to plan a garden project, using the skills and knowledge they have accumulated before and during training. The situations to be given to each group are based on realities encountered by PCVs in the same program. The objectives of this session are:

- To work in small teams to plan a Garden Project suitable for the programs in which the trainees will serve.
- To use (creatively) knowledge acquired before and during training.

HAND-OUTS:	#110-a	Crossover Garden Planning Situation
	#110-b	Nutrition Garden Planning Situation

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

HAND-OUT #110-a

CROSSOVER GARDEN PLANNING SITUATION

Your school has already established Home Projects with the F.F.T. students. Five students have been working together growing long beans for the local market. They have asked for your help in growing other vegetables that could earn them more money than long beans. Here is data specific to the situation, otherwise assume that the situation follows regional and national norms.

MARKET POSSIBILITIES

1. The provincial market is 30 km away. A local merchant raises layers and sends eggs to the provincial market every morning.
2. The local market, consisting of a dozen women who sell vegetables and other products.
3. The women who sell lunch to students and teachers.

Note: The students take some of their beans home to eat and will do so with all crops. However, this doesn't earn them the money that they desire.

LOCAL CLIMATIC CONDITIONS

You are in Nakorn Phanom Province.

Rainfall: Begins in April and is intermittent and light until late May or early June, when it becomes suddenly heavy. This lasts until late September. The rains dwindle through October. November through March is dry.

Temperature: Rainy Season - daily highs in 90's and lows in 70's.

Cool Season - highs in 80's and lows in 40's.

Hot Season - highs in 100's and lows in 70's.

Soils: Sandy soils, low in all nutrients and organic matter, slightly acidic.

Other: Very strong winds, especially in cool season. Tobacco mosaic virus is common.

RESOURCES

1 rai of level land bordering a stream that never dries up.

One boy's family raises pigs (30-50 head) which are near the plot.

AVAILABLE INPUTS

In provincial town: All fertilizers mixes.
All seed types.
Wide variety of chemicals.

In local area: 16-20-0, 21-0-0 and 45-0-0 fertilizers.
Only out-of-date seed.
Only most popular chemicals (also most dangerous).
Most tools and some machinery.

YOUR MISSION (Which you must accept)

Plan the best use of the boys' 1 rai of land, 10 boy-hours/day of labor and 500 baht of capital. Do the following:

1. Choose a marketing strategy you will use.
2. Choose 5-6 vegetable varieties suitable to the situation. Justify your choices.
3. List all the inputs you will use, the general quantity and rough price of each.
4. Choose one vegetable and describe how you will plant it to insure a uniform flow of produce. Give a sample planting/harvest schedule.
5. Draw a map of the plot, giving it any shape you choose. Show the size and configuration of beds and facilities. Show the relative quantity of each vegetable that will be grown.

In addition, answer the following questions:

6. Where will you (the boys) get equipment and inputs?
7. If additional money is needed, where will it be found?
8. How will you help the boys to plan their garden?
9. How will each of the crops be harvested - entire plot at once, plants as they mature, leaves and fruits as they mature?
10. How will produce be sent to market?

HAND-OUT #110-b

NUTRITION GARDEN PLANNING SITUATION

Your Ampoe's Agriculture and Public Health workers have been working together with Housewives' Groups. One village has a strong group which has already completed a few small projects. Your colleagues have convinced these women that they can successfully grow vegetables year-round, not only in the cool season. Because of your interest and training in vegetables, you've been asked to work with the core group of ten women who are most interested in the project.

MARKET POSSIBILITIES

1. The Provincial market is 95 km away, half of the distance is dirt road.

2. The Ampoe market is 12 km away, all of it dirt road.

3. One shop in the village sells fresh vegetables, brought in from the Ampoe.

4. Home consumption.

LOCAL CLIMATIC CONDITIONS

You are in the southern part of Srisaket Province.

Rainfall: Is erratic and undependable, varying greatly from year-to-year, flood-to-drought. Usually begins with light "mango rains" in April and picks up sometime in June or July. Heavy rains come at any time or not at all. There's usually little rain in October and none from November until April.

Temperature: Rainy Season - daily highs in upper 90's and lows in 80's

Cool Season - highs in 80's and lows in 50's

Hot Season - highs in 100's and lows in 80's

Soils: Very sandy, low nutrient content, no organic matter and acidic.

Other: Nematodes are a problem.

RESOURCES

Land: All have access to rice and cassava fields, that are at varying distances from the village. All have 50-200 sq m of space at their houses.

Capital: 1,200 baht left from previous project. Most are willing to invest some money, if there are good reasons.

Water: Most streams and ponds dry-up in the hot season, but not all. Some homes and fields have year-round access to water.

Manure: All of them raise 1-5 buffaloes. Some raise pigs and/or cattle.

AVAILABLE INPUTS

In provincial town:	All fertilizer mixes Most seed types Wide variety of chemicals Wide variety of equipment and machinery.
In ampoe market:	16-20-0, 21-0-0 and 45-0-0 Inorganic fertilizers Old and poor-quality seed Only the most popular chemicals Simple tools
In village:	No fertilizer Some poor seed No chemicals

YOUR MISSION (which you must accept)

Plan how to organize the women to begin growing vegetables this cold season in a way that will lead to hot season gardening, i.e. concentrate on the cool season, but have an outline for the hot season. Do the following and justify:

1. Choose a marketing strategy, if any.

2. Decide whether to do one communal plot, a few communal plots, or individual plots.

3. Choose the vegetables to be concentrated on in both seasons.

4. List all of the inputs that will be needed, the general quantity and rough price estimate.

5. Choose one of the vegetables and describe how it will be planted, where, by whom, when, and how often. Give a sample planting/harvest schedule.

In addition, answer the following questions:

6. How will the vegetables be distributed; by whom?

7. How will animals be integrated into the project?

8. What role will husbands and children play?

9. How will you help the women to plan their project?

10. What nutritional benefits will come out of the project and who will be benefited?

SESSION TITLE: Getting Feet in Doors

SESSION #111 WEEK #12 DAY #71 (111-12-71)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 C

The Session Design for this Program Specific Session is in Appendix

TRAINEE APPENDIXES

A. Program Specific Sessions

B. Other Components: Language, Culture,
Role in Development, Home-stay

F. Glossary of Technical Terms in Thai and English

G. Resource List

H. Miscellaneous Appendixes

APPENDIX A: PROGRAM SPECIFIC SESSIONS

34 - 2 - 9	L.S.S. Project and Crossover Role
50 - 3 - 16	L.S.S. School Field Trip
70 - 5 - 25	School Hierarchies and Relationships
74 - 5 - 26	School Analysis
95 - 7 - 41	Ajaan Yais I
102 - 8 - 45	Ajaan Yais II
109 - 9 - 50	Thai Students' Needs and Motivations
111 - 12 - 71	Getting Feet in Doors

SESSION TITLE: The L.S.S. Project and Crossover Role

SESSION #34 WEEK #2 DAY #9 (34-2-9)

PRESENTER:

CO-FACILITATOR:

TIME: 13:00-15:00 C

INTRODUCTION: SESSION OBJECTIVES

Trainees arrive in Thailand with almost no knowledge of their role as Crossovers in the L.S.S. (Lower Secondary Schools) Project. The Crossover Program is unique and the L.S.S. Project is the context in which the program exists and, in fact, is justified. Thus, for trainees to see the importance of agricultural training and its relationship to the TEFL training (and how they will use agriculture in their role as volunteers) it is important that the Crossover role and the L.S.S. project be explained early in training. The objectives of this session are:

- o To understand the general objectives, policy and implementation of the L.S.S. Project and its predecessors.
- o To understand what Peace Corps and the Department of General Education expect of Crossovers, especially in agriculture.

HAND-OUTS: #34-a Crossover Role and Job Description

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Education	Role
Schools	L.S.S. Project
Equality	Community Development
Budget	Rural
	Department of General Education

HAND-OUT #34a
THE CROSSOVER ROLE

THE AG PROGRAM AND YOU (US)—SOME THINGS TO DO

YOUR JOB is to improve the qulity of education (both TEFL and Agricultural) that students receive at your school. You do this by directly working with students and by working with other teachers.

YOUR SOCIAL ROLE is to teach each child with whom you work to be useful and respected in his/her village, as a farmer or something else, rather than teach him/her skills that can only be used in a big city. Do not train students to leave home. Help them want to stay and be able to stay.

ODD JOBS: There are many useful roles you can play and skills you can bring that are not confined to TEFL and AG roles. Some of these involve being a:

Facilitor/Resource Person:

- Get people working together in new ways
- Access to Ajaan Yai
- Access to outside resources
- Access to money

Idea Person/Creativity

- Cross cultural
- Here because you're different
- still fitting in

Social

- Community events (religious parties)
- School evunts
- drinking
- Songs
- tiows
- Add to teacher prestige

AGRICULTURE: There is much more to agriculture than projects. First you are here to help with the teaching of agriculture, to improve how agriculture is taught at your school. You are not an Extension Agent, though you may do a little extension work. You are a teacher. You work out of a school. Fit your Agriculture vision to that situation. Here follow some ideas:

Some general things to work for:

Relevancy (skills these kids can USE in their lives in the near future)

- to kids who will be farmers
- to kids who will have other professions

Urban Migration and the Civil Servant Menntality

- Role models

- expectations
- self esteem
- food in the belly

Theory and Practice--Bridge the Gap (School vs. Home).

- Slave work
- memorization
- thinking skills
- planning skills
- responsibility

Ideas they can pass on to their parents

Modernization and World Economics

- the world is changing
- you've seen more of it
- East and West

AGRICULTURAL POSSIBILITIES--IDEAS TO LOOK INTO

HOME PROJECTS: These get you out into the communities where you can learn, work with kids one-on-one or in small groups, become acquainted with farmers and bridge the gap between classroom and reality.

FFT: Future Farmers? Have they thought abou the future? Can you help them get there?

DISPLAYS AND DEMONSTRATIONS: At school, in the community, at the market, at a Wat, in a newspaper shelter, wherever someone could use some information.

LOCAL EXPERT: There may be something that somebody knows about that you could learn and that would be of use.

RESOURCES: Get some of those resources to your school and community where they can do some good.

IDEAS: People may need some fresh jolts in their thinking. And, then again, maybe they don't.

COMMUNITY SERVICE: Not much extension, probably; often one day activities that are easy to set up and do. Students can get involved.

CLASSES: Help improve the in-class teaching of Agricultutre by helping develop: lab demos to go with lessons; teaching aids; lesson planning (especially by month and term); teaching methodology (similar to TEFL); relevancy; integration with field work;

YOU DON'T NEED TO BE THE ONE PROVIDING THE TECHNICAL SKILLS!!!!!ORGANIZE, MOTIVATE, LINK, FIND RESOURCES, GET THINKING GOING, ASK QUESTIONS!!!!!

SESSION TITLE: L.S.S. School Field Trip

SESSION #50 WEEK #3 DAY #16 (50-3-16)

PRESENTER:

CO-FACILITATOR:

TIME: 13:00-17:00 F (possibly full day)

INTRODUCTION: SESSION OBJECTIVES

Peace Corps In-Country Training prepares trainees to live and work at their future sites. For Crossovers, these sites are L.S.S. Project schools. In order to picture their future situation more clearly, trainees visit an actual L.S.S. Project school. This session is scheduled near the beginning of training and, ideally, the school visited should have a Crossover assigned to it, but that is not necessary. The objectives of this session are:

- To introduce trainees to an L.S.S. Project school, its staff, students and facilities.
- To show trainees what a Crossover PCV has done in one or two years at the school.
- To allow trainees to see the school's agriculture and English programs, meet teachers and students, andd see teacher housing.

HAND-OUT:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: School Hierarchies and Relationships

SESSION 370 WEEK #5 DAY #25 (70-5-25)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:00 C

INTRODUCTION: SESSION OBJECTIVES

An important part of the Crossover volunteer's job is to find a comfortable niche in the school's administrative hierarchy for him/herself. To work successfully, Crossovers need to understand that hierarchy. Equally or more important than this formal hierarchy, are the informal relationships among school personnel--from janitor to Principal. The place each PCV occupies within these relationships has great impact on both the success and happiness of each volunteer. Trainees need to understand these situations; to begin to do so early on helps them learn from the PCV visits. The objectives of this session are:

- To learn a model administrative hierarchy for L.S.S. Project schools, the duties of teachers within the hierarchy, some of the possible exceptions and places were Crossovers can fit into the hierarchy.

- To discuss some of the key factors that affect relationships among the personnel at L.S.S. Project schools.

HAND-OUT: #70-a School Administrative Structure
#70-b Secondary Administrative Structure

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

Hierarchy
Structure
Duties
Relationships
Administration
Positions
Informal
Formal
Social

HAND-OUT #70a

SCHOOL ADMINISTRATTIVE STRUCTURE
(ระบบการบริหารโรงเรียน)

PRINCIPAL (อาจารย์ใหญ่)

ADMINISTRATION
(ฝ่ายธุรการ)

- Accounting
- Property
- Correspondence
- Suplies (พัสดุ)

ACADEMIC AFFAIRS
(ฝ่ายวิชาการ)

- Department Heads (หัวหน้าหมวด)
- Grades and Evaluattion
- Registration (ทะเบียน)
- Lesson Plans (แผนการสอน)
- Curriculum (หลักสูตร)

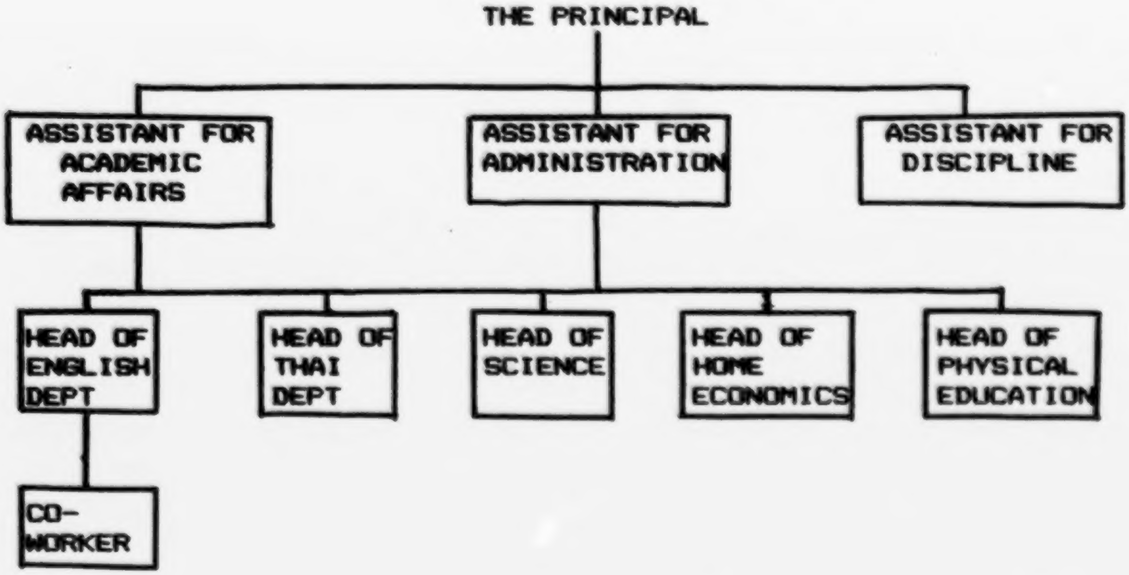
STUDENT AFFAIRS
(ฝ่ายปกครอง)

- Student Behavior
- Discipline

SERVICES
(ฝ่ายบริการ)

- Community Service (บริการชุมชน)
- School Clubs (ชุมชน)
- Activities (กิจกรรม)
- Nurse (พยาบาล)
- Co-op (สหกรณ์)
- Sports (กีฬา)
- Post Office

SECONDARY ADMINISTRATION SYSTEM


THE PRINCIPAL
ASSISTANT FOR ACADEMIC AFFAIRS
ASSISTANT FOR ADMINISTRATION
ASSISTANT FOR DISCIPLINE
HEAD OF ENGLISH DEPT
HEAD OF THAI DEPT
HEAD OF SCIENCE
HEAD OF HOME ECONOMICS
HEAD OF PHYSICAL EDUCATION
CO-WORKER

SESSION TITLE: School Analysis

SESSION #74 WEEK #5 DAY #26 (74-5-26)

PRESENTER:

CO-FACILITATOR: (a trainee)

TIME: 9:00-10:00 C

INTRODUCTION: SESSION OBJECTIVES

Before a PCV begins to think about the work s/he will do, s/he must find out with what there is to work. An analysis of the school situation that s/he is in will provide a starting point for deciding on specific work goals and strategies. Such an analysis will show the PCV what is realistic, what has been done and for what the PCV can expect support. Most important, the PCV will learn about the people with whom to work. This session takes place before the PCV visits in order to allow trainees to do a mini-analysis of the schools they visit. The objectives of this session are:

- To learn what points should be considered in a school analysis.
- To discuss how to do a school analysis.

HAND-OUTS:

#74-a	School Facilities
#74-b	Local Resources Worksheet
#74-c	Ampoe, Jangwat and Regional Information Sources.

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

To analyze

Facilities
Resources
Skills

HAND-OUT #74a
SCHOOL FACILITIES

All of our schools received 6 to 10 million baht worth of buildings and equipment. The equipment is more or less the same for every school. By the time you arrive, various things may have been permanently borrowed, lost or used in such a way as to make them useless. The following is a partial list of some important things to locate, repair or replace. Do not expect these things to be available for your and other folks' use.

SCHOOL IN GENERAL

Pick-up truck (probably not included for C.S.S. II schools)
Motorcycle
Tractor
Science Department Equipment
Home Economics Equipment
Industrial Arts Equipment

AG SHOP

hoes, rakes, shovels, soil augers
hammers, saws, planes
grafting knives, pruning shears
watering cans, buckets
sprayers, masks
soil test kits, fertilizer test kits
syringes, wing sticks, castrating equipment
grinder, pump
incubator

AG LAND

at school, next to school, rented
fish ponds
orchards, nursery
rice paddy
vegetable plots
coops and pens
compost

WATER

water system
wells
canals
ponds; streams

MARKETING OR USE

food sellers
school co-op
other teachers
displays for visitors

HAND-OUT #74 b
LOCAL RESOURCES WORKSHEET

CROPS	What
	When?
	How much?
	Inputs?
	Residues?
INDUSTTRY	Rice mills?
	Lumber?
	Canneries?
MARKETS	Local?
	Provincial?
	Regional?
	Canneries?
TRANSPORTATION	Rail?
	Trucks?
	Buffalo carts?
NATURAL PLANTS	That are eaten?
	Fed to animals?
	Medicinal?
GOVERNMENT FACILITIES	
	Local?
	Provincial?
	Regional?
SCHOOL FACILITIES	
SKILLED PEOPLE	Mechanics?
	Merchants?
	Masons?
	Farmers?
	Civil Servants?
WATER	For farmers' use?
	Municipal use?
MONEY	Local clubs?
	Fund raisers?
	Rich merchants?

HAND-OUT #74c

INFORMATION SOURCES: PEOPLE AND PLACES

AT SCHOOL

Janitors	ภารโรง
Agriculture teachers	ครูเกษตร
Principal	อาจารย์ใหญ่
Students	นักเรียน

IN COMMUNITY

Village Headmen	ผู้ใหญ่บ้าน
Small Merchants	พ่อค้า
Tambol Headmen	กำนัน
Market Ladies	แม่ค้า
Star Farmers	ชาวนาตัวอย่าง
Tambol Level Officials	เจ้าหน้าที่ระดับตำบล
Primary School Teachers	ครูประถม

IN AMPOE

Ampoe Agriculture Officer and Assistant	เกษตรอำเภอและผู้ช่วย
Public Health Officer and Assistant	สาธารณสุขอำเภอและผู้ช่วย
Development Officer	พัฒนาการอำเภอ
Deputy District Officers	ปลัดอำเภอ
Ampoe Education Officer	ศึกษาอำเภอ
Veterinarian	ปศุสัตว์อำเภอ
Doctors and Nurses	หมอและพยาบาล
Ampoe High School	โรงเรียนมัธยมระดับอำเภอ
Merchants	
Agriculture Supply Stores	ร้านขายวัสดุการเกษตร
Ampoe Agriculture Co-operation	สหกรณ์เกษตรระดับอำเภอ

* All of these have Provincial counterparts!

IN PROVINCE

Agriculture College	วิทยาลัยเกษตร
Non-Formal Education Center	ศูนย์การศึกษานอกโรงเรียน
Teacher's College	วิทยาลัยครู
Soil Developemnt Station	ศูนย์พัฒนาที่ดิน
Fisheries Station	สถานีประมง
Animal Breeding Station	สถานีผสมพันธุ์สัตว์
Seedling Production Station	
Forage Crops Station	สถานีพืชอาหารสัตว์
Plant Propagation Station	สถานีขยายพันธุ์พืช
Animal Diseases Station	สถานีตรวจโรคสัตว์
Soil Survey Division	แผนกสำรวจดิน
Field Crops Station	สถานีพืชไร่

* Those that aren't in your province, are in a nearby province.

IN REGION

Rice Experiment Station	สถานีทดลองข้าว
Field Crops Experiment Station	สถานีทดลองพืชไร่
Plant Protection Center	
Universities - Chiang Mai	มหาวิทยาลัย - เชียงใหม่
- Khon Kaen	ขอนแก่น
- Srinakarin Tharawirote	ศรีนครินทรวิโรฒ
- Maha Sarakham	- มหาสารคาม
- Phitsanuloke	- พิษณุโลก

IN BANGKOK

Universities - Kasetsart	มหาวิทยาลัย - เกษตรศาสตร์
- Chulalongkorn	จุฬาลงกรณ์
- Thammasart	ธรรมศาสตร์
Asian Institute of Technology (A.I.T.)	สถาบันพัฒนาเทคโนโลยีแห่งเอเชีย
A.U.A. - American University Alumni	เอ.ยู.เอ
British Council	บริติชเคาซิล
Asia Foundation	มูลนิธิเอเชีย
Ford Foundation	มูลนิธิฟอร์ด

MINISTRY OF EDUCATION

กระทรวงศึกษาธิการ

Department of General Education	กรมสามัญศึกษา
Special Projects Office	สำนักงานโครงการพิเศษ
Planning Division	กองแผนงาน
Embassies - Canadian	สถานทูต - แคนาดา
- Netherlands	เนเธอร์แลนด์
- Australian	ออสเตรเลีย

SESSTION TITLE: Ajaan Yais I

SESSION #95 WEEK #7 DAY #41 (95-7-41)

PRESENTER:

CO-FACILITATOR:

TIME: 10:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

Good relationships with Ajaan Yais are important for the success of Crossover PCVs. Trainees will have heard about the individual situations of particular Crossovers during the PCV Visits and these should be discussed. Trainees and trainers discuss the roles, limitations, needs and motivations of Ajaan Yais. Possible relationships between Crossovers and their Ajaan Yais are considered. The objectives of this session are:

- To appreciate the Principals situations and limitations;
- To understand the PCV/Principal relationship.

HAND-OUTS: #95a Ajaan Yai Situations

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

HAND-OUT #95a
AJAAN YAI SITUATIONS

SITUATION NUMBER ONE

When you arrive at your school, the Ajaan Yai says that he is very glad that you've come to help with both the English and Ag departments. He wants you to begin teaching English right away (following the guidelines given him by Ajaan Nikorn), but wants you to go slow with Ag. He is embarassed to tell you tthat the school hasn't done much in ag in the past, but he plans for that to change now that the school is participating in C.B.C. II. He explains that the old ag tteacher was an alcholoic. The old guy was transferred out and two new teachers fresh from the Teacher's College have taken his place. These two new teachers are hard-working, but not very self-confident and he wants you to help them think of wortthwhile projects to do in the community and at school. You reply that you've just arrived and need some time to farmiliarize yourself witth the schoo, the teachers and the community. He agrees, suggesting you do your best with English, but spend a lot of time with the two ag teachers.

You get along with the two ag teachers and develop some project ideas with them, but they're afraid to take the responsiblity to start anything. At the beginning of your second term, your Ajaan Yai tells youthat he's very happy with your English teacher and asks how Ag is going. You reply that you and the teachers have some good ideas and that you're ready to start somethinng, but that your co-workers lack confidence. He asks what you would like him to do.

----How will you reply?

-----Situation Number one--Betty West and Donna Keene

Before our meeting with the Ajaan Yai, we both felt that there really was nothing he should do to "prod" the two young ag teachers into action. In fact, we thought that his getting involved might cause some resentment on the part of the ag teachers. We had thought perhaps they should start out doing a joint project in order to gain enough confidence to do individual projects.

Our discussion with the Ajaan Yai was enlightening in several ways. He explained that Thais are accustomed to being given specific orders to do certain tasks, and that, furthermore, they are delighted when they are told to go ahead and pursue a pproject in which they are interested. We concluded that having the Ajaan Yai express interest in and encouragement for their projects would probably give the ag teachers some confidence to go ahead with them.

Another interesting point made by the Ajaan Yai was that Thais do not usually work well at sharing responsibility for projects; they would prefer to have their own projects. We concluded tthat the Peace Corps volunteer should tell each of the ag teachers to do an individual project in his or her area of expertise, with the volunteer giving assistance to each.

In further disucssion after the meeting, we decided it would have been a poor deision to tell the Ajaan Yai we did not need his help. It would not have shown proper respect for his position. Also, we felt it was just good policy to have the Ajaan Yai involved in initiation projects, if only in a normal way.

SITUATION NUMBER TWO

Your school is loaded with flowers and ornamenntal plants of all shapes, colors and sizes, making it dazzlingly beautiful throughout the school year. There is also a coconut orchard beside your school. Las month your Ajaan Yai went to a meeting and heard about a school that raises wild bees in order to sell the honey. Your Ajaan Yai thinks that the idea is appropriate for your school and calls you in to talk about it.

----What do you think about the idea?

-----Than the Ajaan Yai tells you that........

----How they replied.....

The first thing we did was to make sure the Ajaan Yai understood that we knew little about bee-keeping, but that we were very willing to research the idea. The Ajaan Yai wanted to use the more productive "farang bees," which would be more expensive, and we tried to suggest that Peace Corps may not be able to supply all the money. In any case we needed more research. We also suggewted some student involvement, which tghe Ajaan Yai apparently hadn't considered, but he was receptive (Later, talking with Buddyt, we thought about involving other teachers--carpentry, science--as well.

In general we thought the project was worth supporting, as a teaching tool and as a possible method of generating funds for the more necessary Agricultural projects. We planned to ensure some student/teacher involvement. The project would also help to start off with a good relationship with the Ajaan Yai.

SITUAITON NUMBER THREE

Since C.S.C. has supplied new classroom buildings to your school, the shelters that were formerly used for classes have gone unused. Your Ajaann Yai, after seeing some native chickens make one room their home, thought these shlters could be changed into chicken coops. He checked things out at the market and found that 50 chickens are brought in from the provincial town every day. Then he checked with a friend of his who runs an Agricultural supply store in town. The two of them figured out the logistics of raising and selling broilers, the cost of the materials, feed, chicks and medicine and even did a market analysis. Then the Ajaan Yai patiently explained all the details to you and asked how soon you could get the money from Peace Corps to start the project. He's talking about 400 chickens per week and 60,000 baht.

-----How will you respond? Why?

-----Respond to Situation Number Three

If the Ajaan Yai approached tthe subject as Buddy di (a take-charge-do-as-I-say attitude) I would respond with a very neutral, pssive reply. He's going to lead, so let him lead. Without too much pressure I would ask questions regarding educational value, student participation, leadership, and control of money. If I didn't approve of his approach to the projectt, but tthought it could be useful with some changes I would suggest it, but not push it. At this same time or within a day or two I would let it be known I would also like to do some other projects. I would then submit his project with a note to P.C. to either turn it down or limit the funds. I could then tell the Ajaan Yai that I've done the best I could, why don't we try another project.

Basically, with this type of an Ajaan Yai, you need to be able to flow with him and subtly get you want with trade-offs. I think to argue and defend excessively would be futile.

SITUATION NUMBER FOUR

You';ve been at your site three weeks when your Ajaan Yai invites you to take a walk around the school with him. He says that he'd like you to help with the Ag program and asks you for some ideas on what might be done. You reply enthusiastically that you'd love to help. Since you don't see any current projects, except for a few scraggly vegetable beds and some wandering chickens, you suggest that the school begin with a small chicken project, a pair of pigs and better vegetable plots, since these were things you covered in Training, although you may or may not feel confident hee ye. The Ajaan Yai enthusiastically agrees and the conversation ends.

You buckle down to teaching English, figuring out the school systems and acquaintting yourself with local agricultural practices. A month or so after the first conversation, you Ajaan Yai calls you into his office and asks how you'redoing. You reply that you're beginning to feel comfortable at the school and are acquainting yourself with how everything works at school and in the community.

"Have you started the chicken project yet?" he asks.
"No, I'm not prepared to start, yet," you reply.

He goes on to enquire about he other projects that the two of you discussed and begins to frown more and more every time you say you haven't started.

"When do you plan to do some work?" is his final question.

-----What would your response be?--both immediately and in the coming weeks.

-----Analysis:

What came out of the discussion with the Ajaan Yai was that the Volunteer had committed himself to a leit of projects. What was learned from this discussion was that the volunteer should have--on first seeing the school--keep most of the thoughts to himself. To run off a list of things can lead to trouble. If you do decide to make suggestions, make sure that the Ajaan Yai knows that they are just suggestions--not actual project proposals.

If you happen to be in this situation, the best thing to do is start the project. When the Ajaan Yai calls you in, tell him why you haven't started yet, then tell him that you are willing to start. Avoid a long discusison with your Ajaan Yai if youfeel it is to your disadvantage.

Also, it is very important to check with the Agriculture teacher(s) to see what they're working on.

SITUAITON NUMBER FIVE

You know quite a bit about ducks and figure that an enthusiastic approach at the start of your second term will carry you over any language hurdles and toward a successful, small-scale duck-raising operation beside the school pond. Checking with Bangkok, you find that there will be no problem getting Peace Corps Host-country funds to buy ducklings, feed and equipment. As far as materials for building a pen, there is a pile of old but usable wood waiting for your carpentry skills and the student labor force to help put it together. Upon approaching the Agriculture teacher, he changes the conversation around to his son's birthday next month. When you try to return to the ducks, he mentions that he must take his son to the doctor for a check-up next week. You give up and go to talk to the Ajaan Yai. The Ajaan Yai is positive toward your idea at first, but later seems to be hesittant to give permission. He wonders if the Peace Corps money could be used in a better way and suggfests that the wood pile saved fo a more important use. You reply with a more careful reiteration of yoru idea, being careful to explain everything so he can udnerstand. He grants permission and dismisses youafter asking you if you've every lived next to a smelly duck pen.

What is your next step and why?

From the above descripttion, it is evident that the sole supporter of the project is the PCVolunteer. The Ag teacher has shown no interest in the project and the Ajaan Yai has expressed a number of reservations, in spite of finally approving it at the volunteer's continued insistance. The volunteer should reevaluate his/her motives for the project, his/her rapport with the Aan Yai, he attitude of the Ag teacher regarding projects, and the particular needs of the school, as well as the school's potenttial for other, more valuable projects.

The volunteer needs to aproach the Ag teacher with the intent of learning how far the teacher is willing to go with projects. This, of course, should be done in an indirect and inconspicuous fashion. Regardless of the Ag teacher's feelings aboutt projects, there is no reason for the volunteer to personally alieniate him. We would even suggest the possiblity of making small talk about he Ag teacher's son, whom he seems particularly fond of. Share interests, if possible.

With regard to the Ajaan Yai, the volunteer should back off from the duck project, and atttempt to discover with the A.Y. would like to see done in the line of projects. The volunteer could express possible problems with the duck ponds and suggest alterantive projects in an open enough fashin to invite the A.Y. to make his preference or suggestion. The volunteer needs to show the AY he is only too glad to work with the A.Y., as well as with the rest of the school community.

HYPOTHETICAL AJAAN YAI SITUATION NUMBER SIX

You've gotten tto knnow your Ag co-worker fairly well. He has some good ideas and seems to know his stuff. He'd like to raise a few pigs, which give you fond memories of the cute little due at the Training Center. You design a pen with a cement floor, look into piglet prices and check out the lcoal feed sittuation, local market prices. You discover that you'd make a small profit, which is great since your primary objecttive is to have some real live pigs to teach about. Once the two of you think you have everything figured out, you bring the project up with the A.Y, who asks for a few days to think it over, after which he calls the both of you into his office. He tells youthat he has a great idea. Two months ago he visited a buffalo bank, but since most local farmers use tractors, a pig bank would be better for your community. He tells youand you Ag co-worker to redesign the project with 2 boars and 10 sows (all pure bred) and pens similar to the Provincial Ag College, which are all cement with steel railings, self-waterers, pig showerers and faucets for easy cleanings.

What would you do next?

1. Be fair, diplomatic and sensitive to the AY's views. However, I might find that the "Thai view" may be that even suggesting that impediments to his proposed plan could exist may constitute an open confrontation toward him on my part.

2. Attempt tto cause a delay of action in several ways. However, lacking in concrete information, I may not be able to slow down the A.Y at all.

3. If the Ag teacher totally suports the A.Y's idea and my pleas for cautious planning fall on deaf ears, I would go for his help separately at another time.

SESSION TITLE: Ajaan Yais II

SESSION #102 WEEK #8 DAY #45 (102-8-45)

PRESENTER:

CO-FACILITATOR:

TIME: 8:00-9:30 C

INTRODUCTION: SESSION OBJECTIVES

Trainees share thoughts and insights from the role plays done after the Ajaan Yai I session. Then, trainees discuss building good relationships with their future Ajaan Yais. Trainees need to take a positive view towards their supervisors and work to establish good relations with them. The objectives are:

- To share ideas and insights from Ajaan Yai role plays;
- To develop ideas on the relationship Crossovers should have with Ajaan Yais and how to build their relationship.

HAND-OUTS:

READING:

TECHNICAL VOCABULARY:

SESSION TITLE: Thai Students' Needs and Motivations

SESSION #109 WEEK #9 DAY #50 (109-9-50)

PRESENTER: (a trainee)

CO-FACILITATOR:

TIME: 10:30-12:00 C

INTRODUCTION: SESSION OBJECTIVES

The primary focus of Crossover teachers is the student. The topics discussed previously influence the success of each PCV's efforts, but it is the students who are doing the learning of whatever the teacher is teaching. While Thai students are generally obedient and unaggressive, Crossovers need to understand this behavior. It is oftten very easy for PCVs to win the hearts of students, but it is sometimes difficult to teach them. Therefore, some understanding of the psychology of Thai students is necessary: The objectives of this session are:

- To understand why students continue their education into secondary school.
- To understand the needs of students and what motivates them to learn.
- To develop strategies for sucessful teaching of Thai students.

HAND-OUTS:

READING ASSIGNMENT:

TECHNICAL VOCABULARY:

SESSION TITLE: Getting Feet in Doors

SESSION #111 WEEK #12 DAY #71 (111-12-71)

PRESENTER:

CO-FACILITATOR:

TIME: 11:00-12:00 C

INTRODUCTION: SESSION OBJECTIVES

By the time this session is presented, all of the components in the training program (agricultural, TEFL, development, language and cross-cultural) have been presented. It is time to both wrap up training and to have trainees prepare to move into their sites. In order to have a complete image of what trainees have been prepared to do, aspects of training that were previously presented must be reiterated. This will, in turn, help trainees envision their first days, weeks and months at their site. With this perspective, trainees can begin to sketch a site-entry plan. The objectives of this session are:

- To have trainees consider strategies for establishing themselves at their sites, so that they can later fulfill the TEFL/Crossover role.
- To have current and/or former PCVs recommend strategies.

HAND-OUTS: #111-a TEFL and Agriculture: Balancing Act.
#111-b Homework Before You Really Start Thinking

HAND-OUT 111a

TEFL AND AGRICULTURE--BALANCING ACT by Buddy Larson

In the past, many TEFL/Crossovers have not managed to "cross over." There are many reasons for this, some of which your training has addressed. The Peace Corps Office has been working on some of the other causes and probably each of you now has the knowledge base, skills and opportunity that you will need to crossover. You probably each know what you must do to crossover and that you can start doing so from the day you arrive at your site. In reality, you should be thinking in terms of TEFL and Agriculture--50/50--integrating the two aspects of your job. Your TEFL participation will be active immediately, while your Ag participation will begin passively and gradually become active. That is what Crossover means, but you will not be able to crossover if you do not think like a Crossover from the start. Here are a few things to keep you thinking like a Crossover.

1. Your school can use help in both Ag and English. One or the other may be in better shape, but both leave room for improvement and your participation.

2. Your JOB is to do Ag and TEFL (approximately 50/50), not to save one or the other program. Make this clear to people, patiently. Let Ajaan Nikorn help make this clear.

3. Straight TEFL Volunteers do not spend all their time teaching English. They have many other things to do--so do you.

4. Since word gets around quickly among Ajaan Yais, any of us who deviates greatly from the 50/50 role will make it easier for any Ajaan Yai so inclined to encourage others to deviate.

5. Some kids can really benefit from good English teaching and it will help them in the future. Some kids can really benefit from good Ag teaching and it will help them in the future.

6. You are not a Hero in a Comic Book. Everyone has skills, though they may lack some of the skills necessary to solve a specific problem. Help them acquire some of those missing skills, if you can.

7. Neither Ag nor English will save the world, but both can make a contribution.

8. Remember it always seems easier to do something for someone, but it is better to do that thing with that someone, no matter how difficult that may be at first.

9. Reap the benefits of seeing people succeed, not just your own personal successes, then you will be free to go work with (not on) someone else, rather than continue doing the same things for the person whom you maintain in helplessness.

HAND-OUT 111-b

BEFORE YOU REALLY START THINKING

In order for you to be active in the school's Ag Department, you will need basic information, not only about agriculture in Thailand, but about the way your school's agriculture program works. This is a list of questions and topics which you might use to help you focus your initial months of observation, and to help you define the unique situation at your site and how you can fit into it. You will probably find that, as you observe, ideas and possibilities for your work will emerge. Keep in mind that there will be a TEFL Conference in December and an Agriculture Conference, probably in March. After that, you should have an In-Service Technical Training (Both TEFL and Agriculture) that can/should be determined largely by you and your group. If you find gaps in your agricultural program, the conferences and training will be a great opportunity to share experiences, get good ideas from new and old volunteers and get some of the technical knowledge you will need.

PROJECTS: Goals vs. Reality

1. What were the scheduled projects for this term? (last term, last year?) (There is usually a master school plan submitted for every year.)

2. What was actually done the previous term? (previous year?) (May to September.)

3. What projects seem to be active, dead?

4. Where did the funding come from?

5. What were the stated and real goals of the projects carried out? Not carried out?

6. Who benefited from the projects?

7. How much extra, in terms of labor outside school and materials, is required of the students? Janitors? Ag teachers?

8. What do the Department and Ajaan Yai consider to be a very successful project that the school has completed? Why?

9. Failures and why? (much more difficult to determine.)

10. What are the school's big dream ideas? (Many schools have a shining vision of the school somewhere in the future. Whose vision is that? Who shares it? What do you think of the vision?)

CLASSES

1. Check the number, size, how often, when and where they meet; who teaches; what is taught and how; division of time.

2. What (in general) are the classes studying this term? Why?

3. Really observe Classroom vs. Field work (Theory/Practice):
   Are they related? Integrated? How well?
   Are the students learning in the field ("Learning by doing.")
   OR just providing the labor?
   *****This is an important area that we can help with.

4. Facilities and conditions of them: See Hand-out #74a on school facilities.

FFT: FUTURE FARMERS OF THAILAND

1. How many students?

2. Voluntary or mandatory?

3. Do they have Home Projects, required? voluntary (if so, non-existent?) part of a grade?

4. Do they have School Projects?

5. Who is in charge of overseeing work? Cracking the whip? Cajoling?

6. Who decides on the projects?

7. If the group does work at school, how is the responsibility divided? Best students only, everyone?

8. Again, is FFT a learning experience or just a task force?

ET CETERA

1. Just keep your eyes open: What's going on? Who's in charge? How's it going? How can you fit in?

2. What levels of Agriculture are they stressing? High tech? nothing new at all? theory without practice? subsistence? market?

PERSONALITIES

1. Relationships between department members and Ajaan Yai.

2. Who determines Ag department goals, Ajaan Yai or them? Or agreement?

3. What's the general attitude in the department towards kids? Agriculture? the work? the community? the Ajaan Yai?

4. What problems exist? rivalry? showmanship? romantic and marital? funding?

OUTSIDE SCHOOL

Although we focus primarily on in-school work and at-school work in our jobs as TEFL Crossovers, you still need to be very aware of the students' backgrounds and the life they will lead. And someday you may be asked to help with something out in a village.

1. Does the Ag department do any extension work? vaccines? castrations?

2. Are they friends with the local Ag Extension people? work together?

3. Check out the seasons and local planting practices.

4. What is the general level of the local agricultural economy? lots of pigs? ducks? goats? cattle? Any large scale animal raising? biogas? market produced vegetables? use of machines? chemical fertilizers?

5. What do people like to eat in villages? in towns?

6. How does the school's teaching compare with the local agricultural economy? eating habits?

7. Market: How often does the food come in? from where? how?

   Are there people interested and knowledgeable about marketing as a concept?

QUESTIONS QUESTIONS QUESTIONS QUESTIONS—Keep asking them!

APPENDIX B: OTHER COMPONENTS:

Session Additions
Role in Development
Home-stay Agriculture Survey

(Language, Cross-Cultural and additional Role in Development Sessions can be found in the Training Manuals produced for Thai 80 and Thai 82.)

SESSION ADDITIONS

Changing Peace Corps programs will necessitate changes in the sessions that make up this training. Some session topics that may need to be included in future training programs are:

- Nutrition
- Fish spawning
- Bee keeping
- Silk Production
- Rubber Trees
- Goats
- Ducks
- Biogas
- Appropriate Technologies
- Indigenous Technologies
- Irrigation
- Cattle and Buffaloes

SESSION TITLE: Introduction to Development

SESSION: L/CC/DEV

PRESENTER:

CO-FACILITATOR

C TIME: 8:00-9:00

INTRODUCTION: SESSION OBJECTIVES

This session is designed to raise some questions about the definition, issues, purposes, approaches and the PCV's role in the field of development. The session should be linked to the language, cross cultural and personal orientation training components. The Development component is described as the application phase of the other components. The objectives are:

- To review comcepts of and attempt to define "development."
- To examine assumptions about development.
- To discuss the "whys" and "hows" of development in Thailand.

HAND-OUTS: #a Definition of Development: A Statement
#b Development Questionnaire

READING ASSIGNMENT: Definition of Development: A Statement

TECHNICAL VOCABULARY:

PEACE CORPS/THAILAND
THAI ___ TRAINING

INTRODUCTION TO DEVELOPMENT QUESTIONNAIRE

1. My field is (circle one) Malaria
Nutrition
TEFL/Crossover

2. I see development as.....................

3. Thailand's development is the responsibility of ....

4. I see my role in Thailand's development as ....

5. I think a successful devleopment project includes ....

6. Community analysis means ....

7. I hope the following will be included in technical orientation......................

8. I would like to discuss more about,.....................

HOME-STAY AGRICULTURE SURVEY

It may not be possible for all of you to do vegetable plots during your home-stay. If lack of time or space prevents you from doing a vegetable plot or two, do the following survey and learning/work. You should already have a rough idea of what agricultural things your family is doing. Most rural familes, whether they are farmers or not, do a number of things on a small or subsistence level, with only a few market crops. While the market-oriented crops or animals provide income, the small-scale activities provide many things that would otherwise have to be bought or gone without. It is a rare family that has nothing besides its primary economic activity. Ask some of the family members to walk around the house and compound with you. Find out what plants are weeds (i.e. taking up valuable space for no purpose) and what plants are useful. Of the latter, find out what each plant is used for (food, seasoning, medicine, decoration, whatever). Then ask about their crops that are away from home and, if reasonable, go to see those also. Finally, find out what animals they raise, even if only one or two.

Around the house:
- kitchen garden
- fruit trees
- vegetable plots or areas
- bamboo
- tobacco
- flowers and ornamentals
- potted plants
- spices and herbs
- medicinal plants
- other useful plants

Away from the house:
- rice
- orchards
- field crops
- large vegetable gardens

Animals:
- chickens (native or improved)
- swine
- ducks
- bees
- cattle
- fish
- buffaloes
- anything else?

Miscellaneous:
- store with ag supplies
- local market
- rice miller
- money lending
- truck driver
- middleman

Some of the above activities require daily attention and care, while others are part-time, sporadic or seasonal. Choose one of the activities that requires daily attention and participate as often as you can. That could mean helping to take care of some pigs or going with "Khun Paw" to collect on a loan. Find out everything that you can about the crop, animal or whatever. Take notes. There are often significant differences between the practices of villagers and the methods advocated by the "experts." Usually, there are reasons for the differences. Understanding those reasons is a necessary aspect of your work in agricultural education. Finally, share what you learn with trainers and trainees, preferably in class.

APPENDIX F

GLOSSARY OF TECHNICAL TERMS IN THAI AND ENGLISH

Agricultural Nouns

bean	ถั่ว
soybean	ถั่วเหลือง
mung bean	ถั่วเขียว
peanut	ถั่วลิสง
sweet potato	มันเทศ
cassava	มันสำปะหลัง
sugar cane	อ้อย
potato	มันฝรั่ง
corn	ข้าวโพด
sweet corn	ข้าวโพดหวาน
field corn	ข้าวโพดไร่, ข้าวโพดเลี้ยงสัตว์
rice	ข้าว
wheat	ข้าวสาลี
sorghum	ข้าวฟ่าง
plant	พืช
flower	ดอกไม้
vegetable	ผัก
cow manure (chicken, pig)	ขี้วัว (ไก่, หมู)
cucurbit	แตง
cucumber	แตงกวา
pumpkin	ฟักทอง
bitter gourd	มะระ
kale	ผักคะน้า
chili pepper	พริก
Chinese cabbage	ผักกาดขาว
cabbage	กะหล่ำปลี
Thai melon	แตงไทย
onion	หัวหอม
spring onion, green onion	ต้นหอม
parsley, coriander	ผักชี
morning glory	ผักบุ้ง
Japanese radish	หัวผักกาด, หัวไช้เท้า
string bean	ถั่วฝักยาว
tomato	มะเขือเทศ
eggplant	มะเขือยาว
garlic	กระเทียม
ginger	ขิง
mint	สะระแหน่
lemon grass	ตะไคร้
lettuce	ผักสลัด
pepper	พริกไทย
grass	หญ้า

erosion	การกัดเซาะ, การพังทลายของดิน
drainage	การระบายน้ำ
storage	การเก็บรักษา
measurement	การวัด
lay out	การวางแผนผัง
production	การผลิต
spacing	การเว้นระยะ
plant spacing	ระยะห่างระหว่างต้น
row spacing	ระยะห่างระหว่างแถว
planting depth ______cm.	ปลูกลึก ...... ซม.
germination	การงอก
variety	พันธุ์

Agricultural verbs — คำกริยาเกี่ยวกับแปลงเกษตร

to grow, to plant	ปลูก
to dig	ขุด
to turn under	กลบ
to seed	หยอด
to plow	ไถ
to cultivate	พรวนดิน
to fertilize	ใส่ปุ๋ย
to water	รดน้ำ
to harvest, to pick	เก็บ
to stake	ปักหลัก
to raise (the plot)	ยกแปลง
to transplant	ย้ายปลูก
to tie (string)	มัด, ผูก (เชือก)
to graft (tree)	ตอน (ต้นไม้)
to grow seedlings (mushroom, seedlings)	เพาะ (เห็ด, กล้า)
to pull out	ถอน (หญ้า)
to sprinkle	โรย
to broadcast	หว่าน
to compete for food	แย่ง (อาหาร)
to thin	ถอนแยก
to prune	ตัดแต่งกิ่ง
to mulch	คลุมดิน
to spray (insecticide)	พ่น (ยาฆ่าแมลง)
to check	สำรวจ
to store	เก็บรักษา
to drain	ระบายน้ำ
to measure	วัด
to emerge (sprout)	งอก

Animal Care nouns — คำนามเกี่ยวกับสัตว์

pen, coop, cage	คอก, เล้า, กรง
animal feed	อาหารสัตว์ (หมู, ไก่)
waterer, feeder	ราง (น้ำ, อาหาร)
brooder	กก, เครื่องกก
hatch, incubate	ฟัก
vaccine, medicine	วัคซีน, ยา

disease	โรค
wing	ปีก
leg	ขา
anus	ตูด
lungs	ปอด
liver	ตับ
stomach	กระเพาะ
parasites.	พยาธิ

Animal Care Verbs — คำกริยาเกี่ยวกับสัตว์

to raise	เลี้ยง
to feed	ให้อาหาร
to castrate (pig)	ตอน (หมู)
to choose	เลือก
to breed	ผสมพันธุ์
to vaccinate, to inject	ฉีด (ยา, วัคซีน)
to kill	ฆ่า
to lay eggs	ออก (ไข่)
to build, to make	ทำ, สร้าง (คอก, เล้า)
to cage, to pen	ขัง
to give birth	ออกลูก (คลอด)
to be in heat	เป็นสัด
pregnant	มีท้อง

TREES AND PLANTS — คำนามเกี่ยวกับส่วนของต้นไม้

tree	ต้นไม้
root	ราก
trunk	ลำต้น
stem	ลำต้น, ก้าน
branch	กิ่งไม้
leaf	ใบ
flower	ดอก
fruit	ผล
bulb	หัว
bark	เปลือกไม้
bush	พุ่มไม้
seed	เมล็ด
shoot	ยอด
seedling	ต้นกล้า
cutting	กิ่งชำ
monocotyledon	พืชใบเลี้ยงเดี่ยว
dicotyledon	พืชใบเลี้ยงคู่

Agricultural tools — เครื่องมือการเกษตร

bucket	ถัง
basket	ตะกร้า
bamboo	ไม้ไผ่
hoe	จอบ
hammer	ค้อน
hatchet	ขวาน

herbicide	ยาฆ่าหญ้า
hose	สายยาง
lime	ปูนขาว
plastic bag	ถุงพลาสติก
rake	คราด
sprayer	ถังพ่นยา
space	เสียม
stake	ไม้หลัก
string	เชือก
saw	เลื่อย
tractor	รถไถ
watering can	บัวรดน้ำ

Unit of Measure หน่วยวัด

unit	หน่วย
area	พื้นที่
length	ความยาว
weight	น้ำหนัก
volume	ปริมาตร
temperature	อุณหภูมิ
right angle	มุมฉาก
triangle	สามเหลี่ยม
parallel	ขนาน
calculate	คำนวน
metric system	ระบบเมตริก
plot layout	การวางแผนพื้นที่ปลูก

Soil Management and Fertilizer Use การจัดการดินและการใส่ปุ๋ย

land	ที่ดิน
soil	ดิน
sand	ทราย
loam	ดินร่วน
clay	ดินเหนียว
land preparation	การเตรียมดิน
plow	ไถ
dig	ขุด
bed, plot	แปลง
make raised bed	ขึ้นแปลง
soil structure	โครงสร้างของดิน
soil texture	เนื้อดิน
soil characteristic	คุณลักษณะของดิน
fertilizer	ปุ๋ย
organic fertilizer	ปุ๋ยอินทรีย์
chemical fertilizer	ปุ๋ยเคมี
compost	ปุ๋ยหมัก
manure	ปุ๋ยคอก
fertilizer formula	สูตรปุ๋ย
soil conservation	การรักษาดิน
water management	การจัดการระบบการให้น้ำ
soil moisture	ความชื้นในดิน
plant water requirement	ความต้องการน้ำของพืช

method of watering	วิธีการให้น้ำ
by watering can	ใช้บัวรดน้ำ
by hose	ใช้สายยางรดน้ำ
by furrow	ให้น้ำตามร่อง
irrigation system	ระบบชลประทาน
Insect Control	การควบคุมแมลง
pest	ศัตรูพืช
insect	แมลง
control	การป้องกัน, การควบคุม
identification	การวิเคราะห์ (แยก) ชนิดของแมลง
dragonfly	แมลงปอ
grasshopper	ตั๊กแตน
lady bug	แมลงเต่าทอง
insecticide	ยาฆ่าแมลง
sprayer	เครื่องพ่นยา
safety	ความปลอดภัย
mask	หน้ากาก
rubber glove	ถุงมือยาง
pesticide mixing	การผสมยาป้องกันศัตรูพืช
Disease Control	การป้องกันและควบคุมโรค
disease	โรค
cause	สาเหตุ
caused by	เกิดจาก
bacteria	แบคทีเรีย
virus	ไวรัส
fungus	เชื้อรา
non-living agent	สิ่งไม่มีชีวิต
prevent	ป้องกัน
control	ควบคุม
cure	รักษา
wilt	เหี่ยว
Weed Control	การควบคุมวัชพืช
weed	วัชพืช, หญ้า
to weed	ดายหญ้า
Mushroom Growing	การเพาะเห็ด
mushroom	เห็ด
straw	ฟาง
rice straw mushroom	เห็ดฟาง
level the ground	ทำดินให้เรียบ
mould	แบบพิมพ์
soak in water	แช่น้ำ
layer	ชั้น
kapok seed	เมล็ดนุ่น
spawn	เชื้อเห็ดฟาง
dense	ทำให้แน่น
cover	คลุม

Fruit Tree Propagation and Identification การขยายและการจำแนกไม้ผล

plant propagation	การขยายพันธุ์พืช
fruit tree	ไม้ผล
grafting	การทาบกิ่ง
air layering	การตอนกิ่ง
approach grafting	การทาบกิ่งด้านข้าง
budding	การติดตา
transpiration	การคายน้ำ
slice	เฉือน
coconut husk	กาบมะพร้าว
dig the hole	ขุดหลุม
mixing	ผสม
ratio	อัตราส่วน
mixture	ส่วนผสม
planting	การปลูก

APPENDIX G: RESOURCE LIST

This is the list of resources used and referred to throughout this manual.

oils, Crops and Fertilizer Use

Traditional Field Crops

Knott's Handbook for Vegetable Growers

Intensive Vegetable Gardening

Guide(lines) for Field Crops in the Trops and Sub-tropics

Tropical Crops, by J. W. Purseglov

Crop Production Handbook

Vegetables

Small Vegetable Garrdens

Pest Control

Agricultgural Math

The Practical Poultry Raising Manual (ICE-M-11)

Salsbury Manual of Poultry Diseases

Small-Scale Pig Raising

The Agricultural Development Workers Trainiing Manual, Vol 2,

Community, Culture and Care, by Ann Templeton Brownlee

Where There is No Doctor, by David Warner

Vegetables for the Hot, Humid Tropics, Agricultural Research Service, U. S. Department of Agriculture, ICE, 1983.

☆U.S. GOVERNMENT PRINTING OFFICE: 1985 487 612 0

Since 1961 when the Peace Corps was created, more than 80,000 U.S. citizens have served as Volunteers in developing countries, living and working among the people of the Third World as colleagues and co-workers. Today 6000 PCVs are involved in programs designed to help strengthen local capacity to address such fundamental concerns as food production, water supply, energy development, nutrition and health education and reforestation.

Peace Corps overseas offices:

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Court" Bishops
Court Hill
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Bridgetown, Barbados

ECUADOR
Casilla 635-A
Quito

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Suva

GABON
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Libreville

GAMBIA, The
P.O. Box 582
Banjul

GHANA
P.O. Box 5796
Accra (North)

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6a Avenida 1-46
Zona 2
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c/o American
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Lilongwe

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MAURITANIA
BP 222
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MICRONESIA
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Kolonia, Ponape
F.S.M. 96941

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1, Zanquat
Benzerte
Rabat

NEPAL
P.O. Box 613
Kathmandu

NIGER
BP 10537
Niamey

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P.O. Box 1790
Boroko
Port Moresby

PARAGUAY
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Asuncion

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Manila

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Dakar

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Sri Lanka

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